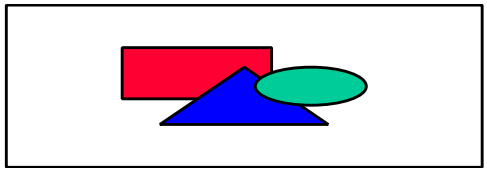
DMCI

DRUG MANAGEMENT FOR CHILDHOOD ILLNESS MANUAL

Douglas Keene
Paul Ickx
Julie McFadyen

September 2000

BASICS



Rational Pharmaceutical Management Project
Management Sciences for Health
1515 Wilson Boulevard, Suite 710
Arlington, VA 22209 USA
Phone: (703) 524-6575
Fax: (703) 524-7898
E-mail: rpm@msh.org

USAID Cooperative Agreement Number:
HRN-A-00-92-00059-13
Strategic Objective # 3

BASICS Project
1600 Wilson Boulevard, Suite 300
Arlington, VA 22209 USA
Phone: (703) 312-6800
Fax: (703) 312-6900
E-mail: infoctr@basics.org

USAID Contract Numbers:
HRN-C-00-93-00031-00
HRN-Q-00-93-00032-00

In coordination with PAHO's Regional Program on Essential Drugs and Technology
Pan American Health Organization
Regional Office of the World Health Organization
525 23rd Street, N.W.
Washington, DC 20037-2895 USA
Phone: (202) 974-3000
Fax: (202) 974-3610

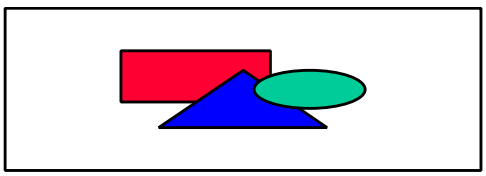
DMCI

DRUG MANAGEMENT FOR CHILDHOOD ILLNESS MANUAL

Douglas Keene
Paul Ickx
Julie McFadyen

September 2000

BASICS



This publication was made possible through support provided by the U.S. Agency for International Development, under the terms of cooperative agreement number HRN-A-00-92-00059-13. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development.

Recommended Citation

Keene, Douglas, Paul Ickx, and Julie McFadyen. 2000. *Drug Management for Childhood Illness Manual.* Published for the U.S. Agency for International Development by the Rational Pharmaceutical Management Project. Arlington, VA: Management Sciences for Health.

CONTENTS

TABLES

FIGURES

AKNOWLEDGEMENTS

This manual could not have been created, tested, and revised without the assistance of a large number of interested professionals. The authors would like especially to thank the following individuals for their contributions.

All of the Participants in the Ecuador (November 1997) and Tanzania (October 1999) DMCI Workshops

BASICS Project [USAID]
David McCarthy
Rene Salgado
Adama Kone

Management Sciences for Health
Jim Bates
Alexandra Beith
Elvira Beracochea
Bethany Brady
Maria Chomyszak
Michael Gabra
David Lee
Maria Miralles
Thomas Moore
David Nelson
Wendy Osborne
Serena Parker
Veronica Pinnell
Alan Rogosch
Kara Suter

Pan-American Health Organization
Rosario D'Alessio
Christopher Drasbek
Enrique Fefer

World Health Organization
Moses Chisale
Antoine B. Kabore
Sam Muziki
Stefan Peterson
Remi Sogunro
Hans Troedsson
Severin Von Xylander

ACRONYMS

AMR ..... antimicrobial resistance
ARI ..... acute respiratory infection
BASICS ..... Basic Support for Institutionalizing Child Survival [Project]
BCG ..... Bacillus Calmette-Guerin
CHD ..... Child Health and Development [WHO]
CIF ..... cost, insurance, and freight
CMS ..... Central Medical Stores
CT ..... caretaker
DAS ..... Drug Availability Study
DMCI ..... Drug Management for Childhood Illness
DPT ..... diphtheria, pertussis, and tetanus
DUS ..... Drug Use Study
EDL ..... essential drugs list
EDP ..... Essential Drugs Programme
EPI ..... Expanded Programme on Immunizations
FOB ..... free on board
HF ..... health facility
HW ..... health worker
ICD-9 ..... International Classification of Diseases 9th Edition
IM ..... intramuscular
IMCI ..... Integrated Management of Childhood Illness
IV ..... intravenous
LA/C ..... Latin America and the Caribbean
MOH ..... Ministry of Health
MSH ..... Management Sciences for Health
NDF ..... national drug formulary
NGO ..... nongovernmental organization
ORS ..... oral rehydration salts
OTC ..... over the counter
PAHO ..... Pan American Health Organization
RMS ..... Regional Medical Stores
RPM ..... Rational Pharmaceutical Management [Project]
RPM ..... respirations per minute
SC ..... subcutaneous
STG ..... standard treatment guidelines
UNICEF ..... United Nations Children's Fund
USAID ..... US Agency for International Development
VEN ..... vital, essential, nonessential
VVM ..... vaccine vial monitor
WHO ..... World Health Organization

EXECUTIVE SUMMARY

Introduction

The Integrated Management of Childhood Illness (IMCI) strategy, promoted since 1995 by the World Health Organization, Division of Child Health and Development (WHO/CHD) and the United Nations Children's Fund (UNICEF), is designed to reduce global morbidity and mortality associated with the major causes of illness in children. The core interventions of IMCI are case management of the five most important causes of childhood deaths—acute respiratory infection (ARI), diarrhea, malaria, malnutrition, measles—and of common associated conditions.

WHO/CHD has identified the supply and management of essential drugs and vaccines as a critical part of improving the health system to allow effective management of childhood illness. Lack of careful selection, incorrect quantification, high prices, poor quality, theft, improper storage, expiration of drugs, irrational prescribing, and incorrect drug use by patients result in losses that can total more than 70% of initial acquisition costs. Effective management saves money and improves care by increasing drug availability and promoting rational drug use.

The Drug Management for Childhood Illness (DMCI) tool is an indicator-based approach designed to provide a rapid assessment of the pharmaceutical and medical supplies management systems in Ministry of Health (MOH) health facilities and drug retail outlets in support of IMCI implementation. The DMCI tool consists of three components: a manual for the lead investigator and organizer of the assessment, a data collector's guide to assist with data collection in the field, and an Epi Info-based DMCI software program to help with data entry and analysis.

The main objective of the DMCI tool is to provide an approach for conducting studies that will provide data on availability and prescribing practices of drugs for IMCI, identify ways to improve IMCI drug management (availability, treatment, and cost), and transfer self-assessment technology by creating country-based operations research capacity. The DMCI tool has a number of potential applications, including—

- ? Providing an overview of the status of the pharmaceutical system, including strengths and weaknesses in both IMCI and non-IMCI facilities, for managers at the MOH and for donors
- ? Conducting a baseline of drug availability, cost, and use that can be used to design and plan interventions
- ? Monitoring changes in systems and the impact of interventions
- ? Comparing the performance of different systems or programs
- ? Promoting discussions with national drug authorities and donors
- ? Advocating for the implementation of the IMCI strategy by identifying potential cost savings from IMCI implementation

The DMCI Manual is designed to take users step-by-step through the drug management for IMCI process, beginning with introducing the concept of indicator-based assessments, then conducting studies that identify specific strengths and weaknesses of the drug supply system for IMCI, and ending with recommendations for ongoing performance monitoring and possible strategies for improvement.

Introducing the DMCI Tool in Latin America and Africa

The Pan American Health Organization (PAHO), the United States Agency for International Development (USAID), the USAID-funded Basic Support for Institutionalizing Child Survival (BASICS) project, and Management Sciences for Health (MSH), through its USAID-funded Rational Pharmaceutical Management (RPM) project, collaborated to develop the DMCI tool in response to the need to improve the supply and management of drugs in support of IMCI. To introduce the DMCI tool in Latin America, a five-day workshop was held. Essential Drugs Programme representatives and IMCI coordinators from Bolivia, Ecuador, Honduras, Nicaragua, and Peru participated in the workshop. Workshop participants were introduced to the methodology, reviewed the tool to provide feedback for adapting the tool for Latin America, and received first-hand experience in using the tool. One of the benefits of this regional approach was the bringing together of the IMCI coordinators and the Essential Drugs Programme managers to share their perspectives and understanding of problems associated with drug availability and use in support of IMCI implementation. The tool was then field tested in Ecuador and Bolivia.

Following the success of the Latin American experience, plans were developed to first adapt, then introduce the DMCI tool in Africa by partnering with WHO/AFRO. The same regional approach used in Latin America was used for Africa. IMCI coordinators and Essential Drugs Programme representatives from Tanzania, Uganda, and Zambia, as well as representatives from international organizations, reviewed the tool during a five-day workshop. The DMCI tool has been implemented in Zambia and plans are under way for Uganda. This current version of the DMCI tool represents the compilation of the Latin America and Africa reviews and country applications.

Preparing for the Two-Part Study

The general approach to a systematic assessment requires answers to the following questions:

Availability

1. Are the drugs and medical supplies required to treat children from two months to five years old available in public health facilities?
2. What are the determinants of product availability in the public sector and what can be done to bring about improvement

Use

1. What are current prescribing practices for important childhood illnesses?
2. Are the current prescribing practices clinically appropriate?
3. How does the drug cost of current practices for treating IMCI health problems compare with what the cost would be if IMCI treatment guidelines were followed?
4. Are the drugs required to treat children from two months to five years old available and affordable in the private sector?

To carry out the two-part study, including interpreting the results and making recommendations for supply system improvement, it is essential to have a good understanding of current drug management operations. At a minimum, this should include qualitative descriptions of the MOH drug management operations and major problems that affect the movement of drugs through the procurement and distribution system.

The DMCI is structured as two complementary studies: drug availability and drug use. Data for 20 core indicators (and 4 supplemental indicators) are collected from four different settings: central level, regional level, district-level health facilities, and drug retail outlets. These indicators are used to measure the performance of different aspects of the drug management system. The DMCI tool recommends a sample size of at least 20 randomly selected health facilities and 20 private sector retail outlets from different parts of the country to achieve a representative countrywide sample. Depending on the size and terrain of the country, this sampling requires approximately 12–15 data collectors who work in teams of 3 or 4.

It is necessary to recruit and train data collectors. Training takes four to five days and should include actual practice in filling out all data collection forms. Once trained, data collectors visit health facilities to review medical records and to observe health provider consultations with child caregivers. The entire data collection process takes approximately two to three weeks. The Data Collector's Guide is designed to facilitate the training of data collectors and can serve as a guide to data collectors in their field work.

Data Collection Techniques

Data for calculating the indicators are collected using seven different data collection techniques: document review, structured interviews, physical inventory checks, records review, direct observations, simulated purchases, and exit polls.

It is essential to understand that all of the data collection instruments are sample forms, and, although they have been used in a number of countries, they must be adapted prior to launching data collection activities. Before starting data collection, study investigators must review the sample data collection forms and adapt them to the country-specific setting.

Some of the indicators are measured on the basis of a list of selected drugs, vaccines, and essential supplies. This list may also be called a "tracer" list. The sample DMCI tracer list should

also be adapted to the country-specific setting. The DMCI is a flexible tool that allows each country to adapt the tool to its country-specific situation.

Collecting the Data

The purpose of conducting the Drug Availability Study is to determine the degree to which the drugs, vaccines, and supplies needed for treating and preventing childhood illnesses are available. In general, the data collection sites include MOH central offices, central and regional medical stores, and health facilities.

The purpose of the Drug Use Study is to assess the clinical and cost implications of prescribing practices for selected childhood illnesses. To gather information for the Drug Use Study, data collection will involve a retrospective review of patient records in MOH facilities. For each IMCI health problem studied through retrospective data collection, a minimum of 600 patient encounter records must be reviewed. This is achieved by randomly selecting 30 medical records for each IMCI health problem in each of the 20 health facilities. Very often, data from records are incomplete. This is particularly true for prescribing data such as the dosage regimen and duration of therapy. "Proxy" data may have to be collected to fill in incomplete retrospective data.

To gather information for Drug Use Study indicators 18–20, a prospective method using structured observations will be employed. Observation requires the data collector to directly observe the behavior of the health worker(s) with the purpose of describing particular prescribing practices. Data collectors should observe 10–15 patient encounters at each of the 20 health facility sites.

The data on the prescribing practices in drug retail outlets will also be collected prospectively by using the technique of simulated purchases. Trained data collectors will have the task of presenting two or three scenarios, that is, one for diarrhea, one for ARI (no-pneumonia), and one for malaria.

As part of the process of conducting reviews of medical records in health facilities, a record of the drugs prescribed will be developed. To collect data on the retail drug prices for these drugs, a data collector will visit the drug retail outlet, ask the drug seller the price of each drug, and record the sales price.

Analyzing Data and Presenting Results

Analyzing the data will help to identify strengths and weaknesses in the drug management process and highlight areas that need specific action to improve IMCI drug management capabilities. Analysis should proceed in a systematic fashion by (1) calculating the indicators and summarizing the information, (2) interpreting the results, (3) disseminating the findings, and (4) preparing a written report. Researchers and study team members should all play an active role in examining data and considering what type of additional analyses may be appropriate.

To disseminate the findings, there should be a formal presentation, encouraging in-depth discussions about the meaning of the results, specific management concerns, and potential interventions. The goal of the presentation is to determine a course of action for building on the strengths and for increasing capabilities in the weaker drug management areas.

A written report should also be prepared to document the data collection experience and the findings. At a minimum, the report should include indicator tables, a list of the drugs most often prescribed, observations made during data review, the survey background, and the different methodologies used to collect the data.

Using the Findings

Responding to the DMCI indicator results and other study findings requires a well- thought-out approach for selecting an appropriate intervention to address an identified problem. Developing an intervention strategy involves six major steps—

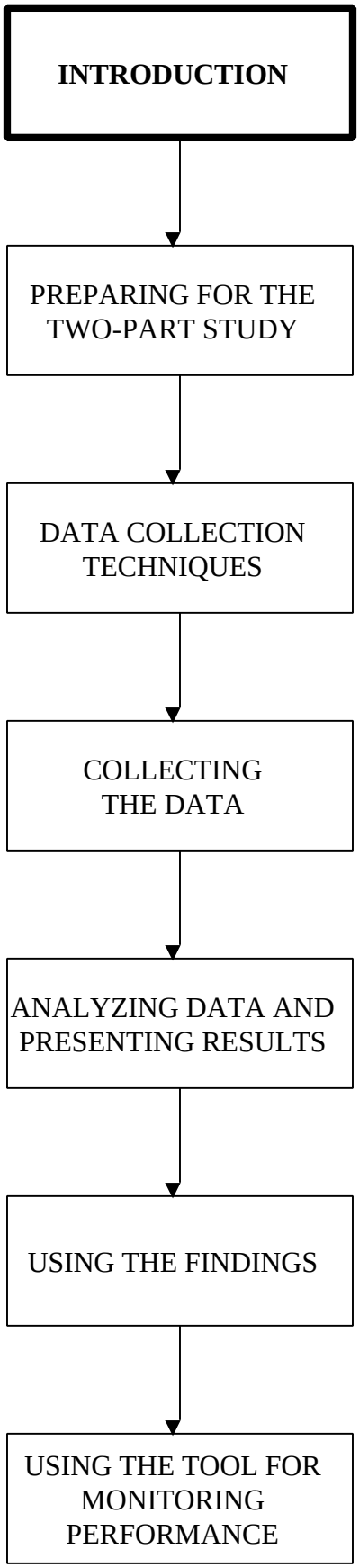
1. Identify the problem and recognize the need for action.
2. Identify underlying causes and motivating factors.
3. List possible interventions.
4. Assess resources available for action.
5. Choose an intervention to test.
6. Monitor the impact and restructure the intervention, if needed.

Conducting the DMCI studies should reveal specific drug management problems that may be addressed, but may not provide enough information on the underlying causes or motivating factors that contribute to the problems. Probing for a more in-depth understanding of a problem may require supplementing the findings with structured interviews or small focus groups.

Using the Tool for Monitoring Performance

Once the DMCI assessment has been completed and the data analyzed, the findings can represent a source of quantifiable baseline measures that can be used to monitor the impact of an intervention. It is important to monitor drug availability and use as a way to evaluate the efficacy of an intervention.

Once an intervention has been identified, performance targets should be established. The DMCI indicators can be used to monitor performance. Collecting data on a few specific indicators on a quarterly or semiannual basis should be a key management strategy to measure progress toward improvements in drug availability and use for IMCI. Each country is unique, and setting performance targets will depend on many factors, such as the time frame of the intervention, available resources, national policies, level of decentralization, and the like. Performance targets should be established based on agreed-upon standards of performance and according to the local situation.


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 1.

INTRODUCTION

IMCI Concept

The Integrated Management of Childhood Illness (IMCI) is a health promotion strategy designed to reduce significantly global mortality and morbidity associated with the major causes of disease in children and to promote their healthy growth and development. The core interventions of IMCI are case management of the five most important causes, globally, of childhood deaths: acute respiratory infection (ARI), diarrhea, malaria, malnutrition, and measles, and of common associated conditions. The strategy also includes selected preventive interventions and recognizes the importance of maternal health. IMCI aims to improve practices in both health facilities and in the home.

In 1995, the World Health Organization Division of Child Health and Development (WHO/CHD) and UNICEF produced a series of training modules to teach the integrated management process to health workers who treat sick children (see Annex 1). The training series includes a model set of integrated standard treatment guidelines (STG) that incorporate existing disease-specific guidelines. To implement IMCI at the country level, WHO recommends that each country identify necessary adaptations of the model guidelines to fit country-specific requirements.

WHO/CHD began implementation of IMCI in 1996. In support of the global implementation of IMCI, WHO and UNICEF have acknowledged the need for ongoing research to better understand country-level issues concerning IMCI implementation. As part of its research agenda, WHO/CHD has identified three components that form the framework for the implementation of the IMCI strategy. These include:

- ? improvement of the case management skills of health staff in management of childhood illness;

- ? improvement in the health system needed to allow effective management of childhood illness; and

- ? improvement of family and community practices.

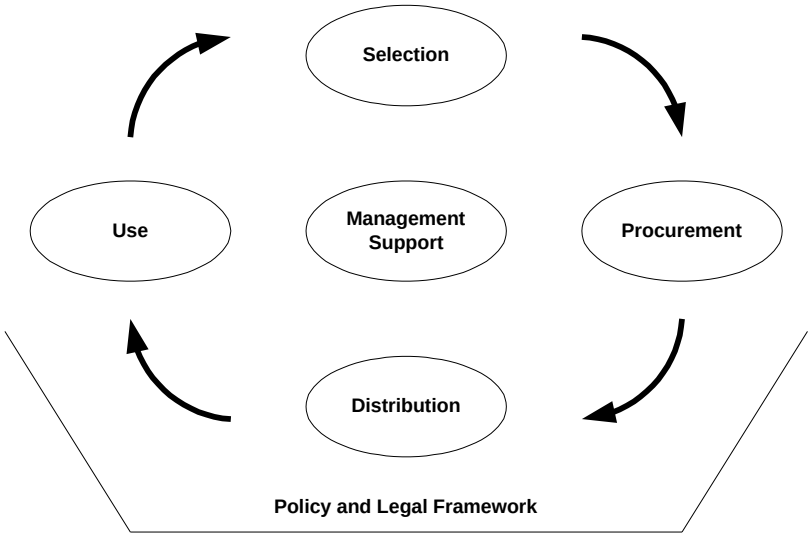
WHO/CHD has identified improving the supply and management of essential drugs and vaccines as a critical part of improving the health system. This *Drug Management for Childhood Illness (DMCI) Manual* is designed to review IMCI drug availability and rational use in Ministry of Health (MOH) health facilities and drug retail outlets in support of planning and implementation of IMCI programs.

Cornerstones of Drug Management: Selection, Procurement, Distribution, and Use

Drug management involves four basic functions: selection, procurement, distribution, and use. Selection involves reviewing the prevalent health problems, identifying treatments of choice, choosing individual drugs and dosage forms, and deciding which drugs will be available at each level of health care. Procurement includes quantifying drug requirements, selecting procurement methods, managing tenders, establishing contract terms, ensuring drug quality, and ensuring adherence to contract terms. Distribution includes clearing customs, stock control, stores management, and delivery to drug depots and health facilities. Use includes diagnosing, prescribing, dispensing, and proper consumption by the patient. Each function builds on the next, forming the drug management cycle.

At the center of the drug management cycle is a core of management support systems: organization, financing and sustainability, information management, and human resources management. These management support systems hold the drug management cycle together. Finally, the entire cycle rests on a policy and legal framework that establishes and supports the public commitment to essential drug supply. Figure 1 shows a graphic display of the drug management cycle.

Figure 1. The Drug Management Cycle



As described in Chapter 2, this manual, using two studies, reviews different areas of the drug management cycle. The Drug Availability Study (DAS) looks at various aspects of selection, procurement, and distribution. The Drug Use Study (DUS) analyzes the use of drugs for IMCI by reviewing the prescribing practices of health workers in MOH facilities and drug retail outlets, the quality of the dispensing practices, and the quality of the drug information provided to consumers in these two settings.

Drug Management in Support of IMCI

One barrier to effective case management of IMCI in the health system is that the drugs needed are often not available. The IMCI model requires that health workers and consumers have access to a core group of drugs and supplies. If these products are not available, IMCI will not work.

The actual management and use of pharmaceuticals is influenced by a wide range of factors, including drug availability, provider experience, economic influences, cultural factors, community belief systems, and the complex interactions among these factors. Drugs have special importance because:

- ? drugs save lives and improve health;
- ? drugs promote trust and participation in health services;
- ? drugs are costly; and
- ? significant improvements in the supply and use of drugs are often feasible.

Lack of careful selection, incorrect quantification, high prices, poor quality, theft, improper storage, expiration of drugs, irrational prescribing, and incorrect drug use by patients result in losses that can total more than 70 percent of initial acquisition costs. Improving the supply and

management of essential drugs and vaccines needed for IMCI is possible. Effective management saves money and improves care by increasing drug availability and promoting rational drug use.

The drugs providers prescribe and dispense are an important index of the quality of care they deliver. The capacity to analyze prescribing data efficiently and make quantitative summaries of prevailing practices is one key to evaluating quality of care and intervening to improve care delivery.

Purpose of the Assessment and Target Audience

Purpose of the Assessment

Country-level preparation activities for IMCI should ensure that the drugs recommended in the adapted treatment guidelines are available. This requires a thorough assessment. This manual presents an indicator-based approach for assessing pharmaceutical management systems (both public and private sector) and programs specifically tailored to the needs of IMCI. This *DMCI Manual* has a number of potential applications, including:

- ? defining the status of the pharmaceutical system, including strengths and weaknesses, for managers and donors;
- ? designing and planning interventions;
- ? defining budget or resource requirements;
- ? monitoring changes in systems and the impact of interventions; and
- ? comparing the performance of different systems, programs, or countries.

Completion of the assessment should result in the identification of problems, which problems might be solved, and what types of interventions are practical in terms of cost-effectiveness and feasibility.

Target Audience

This manual is intended for use by health professionals with a background in drug management and who work at the central and/or district level. The users of this manual may include:

- ? Essential Drugs Programme staff in LA/C, Africa, and Asia;
- ? Ministry of Health (MOH) decision makers, health planners, health economists, donor representatives, or experts responsible for IMCI activities;
- ? system managers at the national, regional, or local levels wishing to measure the performance of the IMCI drug management and supply system; and
- ? social scientists and health project or facility managers who are interested in IMCI operational research and management tools.

Objectives

The purpose of the *DMCI Manual* is to assist the user in assessing those aspects of the drug management system that are critical to ensure the availability and proper use of drugs and supplies essential to IMCI. This manual is not intended for users who need or wish to conduct a complete assessment of the entire pharmaceutical system. Such an assessment is beyond the scope of this manual. The Rational Pharmaceutical Management (RPM) project developed the *Rapid Pharmaceutical Management Assessment: An Indicator-Based Approach* manual to serve as a guide for conducting a complete assessment. The *DMCI Manual*, while based on the rapid assessment model, is tailored to IMCI and complements the more general manual.

The main objective of this manual is to provide an approach for conducting studies that will—

- ? provide data on availability and prescribing practices of drugs for IMCI;
- ? identify ways to improve IMCI drug management (availability, treatment, and cost); and
- ? transfer self-assessment technology by creating country-based operations research capacity.

Role of PAHO, WHO/AFRO, and Other Collaborators

As part of the Latin America and the Caribbean (LA/C) Regional IMCI initiative, the Pan American Health Organization (PAHO), the United States Agency for International Development (USAID), the USAID-funded Basic Support for Institutionalizing Child Survival (BASICS) project, and Management Sciences for Health (MSH), through its USAID-funded RPM project, held a number of discussions about the need to improve the supply and management of essential drugs and vaccines in support of IMCI. Those discussions led to the development of the DMCI tool.

To introduce the DMCI tool in Latin America, a five-day workshop was held. Essential Drugs Programme representatives and IMCI coordinators from Bolivia, Ecuador, Honduras, Nicaragua, and Peru participated in the workshop. Workshop participants were introduced to the methodology, reviewed the tool to provide feedback for adapting the tool for Latin America, and received first-hand experience in using the tool. The tool was then field tested in Ecuador and Bolivia.

One of the benefits of this regional approach was the bringing together of the IMCI coordinators and the Essential Drugs Programme managers to share their perspectives and understanding of problems associated with drug availability and use in support of IMCI implementation. Involving both perspectives promoted communication and collaboration and fostered a more integrated approach to addressing drug management problems.

Following the success of the Latin American experience, plans were developed to introduce and adapt the DMCI tool for Africa by partnering with WHO/AFRO. The same regional approach used in Latin America was used for Africa. IMCI coordinators and Essential Drugs Programme representatives from Tanzania, Uganda, and Zambia reviewed the tool and provided feedback for adapting the tool for Africa during a five-day workshop. Representatives from WHO/Geneva, WHO/AFRO, USAID, the World Bank, and other international organizations also participated in the workshop. The DMCI tool has been implemented in Zambia and plans are under way for Uganda.

The DMCI tool has been designed so that it can be integrated into the IMCI planning process. This current version of the DMCI tool represents the compilation of the Latin America and Africa reviews and country applications. It is anticipated that country-based Essential Drugs Programme staff will become an important resource for planning and implementation efforts.

It is important to mention that the challenge to ensure an efficient and cost-effective drug supply system is constantly evolving. Changes in country policies, budgets, and economic priorities can have an impact on pharmaceutical systems. USAID, PAHO, WHO/AFRO, and others interested in drug supply systems will continue to work toward updating and improving the tools and strategies presented in this manual.

How to Use the DMCI Tool

The DMCI tool consists of three components: this manual for the lead investigator(s); a companion *Data Collector's Guide for the DMCI Manual* to assist with data collection in the field; and a set of diskettes that contain an Epi Info-based software program to help with data entry and analysis. The diskettes also contain a set of the generic DMCI data collection forms to facilitate country-specific adaptation and printing. It is important for study organizers to thoroughly review the *Data Collector's Guide* before training data collectors and beginning the studies.

The *DMCI Manual* is designed to take users step-by-step through the IMCI drug management process, beginning with introducing the concept of indicator-based assessments, then conducting studies that identify specific strengths and weaknesses of the drug supply system for IMCI, and ending with recommendations for ongoing performance monitoring and possible strategies for improvement. The assessment is built around two complementary studies: Drug Availability Study (DAS) and Drug Use Study (DUS). The two studies assess various aspects of drug management in the public and private sectors.

The Drug Availability Study (DAS): The purpose of conducting the DAS is to determine the degree to which the drugs, vaccines, and supplies required for treating and preventing common childhood illnesses are available. Availability of these products should be assessed in the IMCI planning process and/or during the early implementation phase. The DAS indicators will help the investigators to identify possible reasons for the low availability of drugs and vaccines, as well as opportunities for improving the supply. These indicators will guide efforts to ensure that the drugs, vaccines, and supplies required for IMCI are available. Three data collection techniques will be used: document reviews, structured interviews, and physical inventory checks.

The Drug Use Study (DUS): The purpose of the DUS is to review prescribing and dispensing practices for IMCI health problems and assess their clinical and cost implications. This information will be used to involve prescribers in the initiative and to target specific behaviors to encourage or discourage through IMCI training and subsequent monitoring and supervisory activities. The specific health problems addressed in the DUS include acute respiratory infection (pneumonia and non-pneumonia), diarrhea, and malaria. During the adaptation process described later in this manual, the study can be modified to address other related health problems covered by country-specific IMCI strategies. The DUS will use both retrospective and prospective methods. For the retrospective component of the study (in MOH facilities only), the data collection technique used will be medical records review. The prospective component will use the techniques of direct observation and exit poll interviews in MOH facilities and of simulated purchases in drug retail outlets. The data collection techniques used in the availability and drug use studies are described in Chapter 3.

Each study uses specific indicators to measure the performance of a particular aspect of the IMCI drug supply system. Objective indicators and specific program targets provide concrete measures against which actual performance can be compared. There are four general criteria for useful indicators. These are:

- Importance - Each indicator must reflect an important dimension of performance.
- Measurability - Indicators must be measurable, within constraints of time, variable quality, and availability of data.
- Reliability - Each indicator must be reliable over time and with different observers.
- Validity - Each indicator must allow a clear and consistent interpretation and have a similar meaning across different environments.

The indicators used in each of the two studies described below meet these basic criteria.

List of DMCI Indicators

Following is the list of 20 DMCI indicators that will be used to assess the availability and use of drugs and supplies for IMCI. The list includes seven availability indicators and thirteen drug use indicators. The detailed text for the DMCI indicators is included in Annex 2. Four supplemental DUS indicators are included in Annex 3. Supplemental indicators are those that may be helpful but are not considered essential to assess drug management issues for IMCI. The supplemental indicators address measles, malnutrition, anemia, and the dispensing of antibiotics. A sample format for presenting DMCI indicator data is included in Annex 4.

Drug Availability Study Indicators

1. Percentage of DMCI tracer drug products on the national drug formulary (NDF)/ essential drugs list (EDL)

2. Percentage of median international price paid for a set of DMCI tracer drugs that was part of the last regular MOH procurement

3. Average percentage of a set of unexpired DMCI tracer drugs available in MOH storage and health facilities

4. Average percentage of time out of stock for a set of DMCI tracer drugs in MOH storage and health facilities

5. Average percentage of stock records that correspond with physical counts for a set of DMCI tracer drugs in MOH storage and health facilities

6. Percentage of MOH storage and health facilities visited that have a working refrigerator with freezing compartment and thermometer for vaccine storage

7. Percentage of MOH storage and health facilities with up-to-date refrigerator temperature monitoring records

Drug Use Study Indicators

8. Percentage of MOH health facilities visited with an official manual of treatment guidelines for childhood illnesses, based on WHO IMCI treatment guidelines

9. Percentage of encounters diagnosed as no-pneumonia (cough or cold) that are prescribed antibiotics

10. Percentage of encounters diagnosed as pneumonia that are prescribed appropriate antibiotics, according to treatment guidelines

11. Percentage of encounters diagnosed as diarrhea that are prescribed ORS

12. Percentage of encounters diagnosed as diarrhea that are prescribed antidiarrheals

13. Percentage of encounters diagnosed as non-dysentery/non-cholera diarrhea that are prescribed antibiotics

14. Percentage of encounters diagnosed as malaria that are prescribed an appropriate oral antimalarial, according to treatment guidelines

15. Average cost of drugs prescribed as a percentage of costs if IMCI norms for treatment were followed

16. Percentage of prescribed drugs actually dispensed

17. Percentage of caregivers who could correctly describe how to give the prescribed medication

Observation Only

18. Percentage of encounters where health workers asked one or more clinical questions from IMCI guidelines to determine severity of health problem

19. Percentage of health workers who provided basic information to caregivers on how to give the recommended drug(s)

20. Percentage of health workers who told caregivers about any signs of progressive illness and recommended a doctor or clinic visit if the signs appear

Supplemental Indicators (Annex 3)

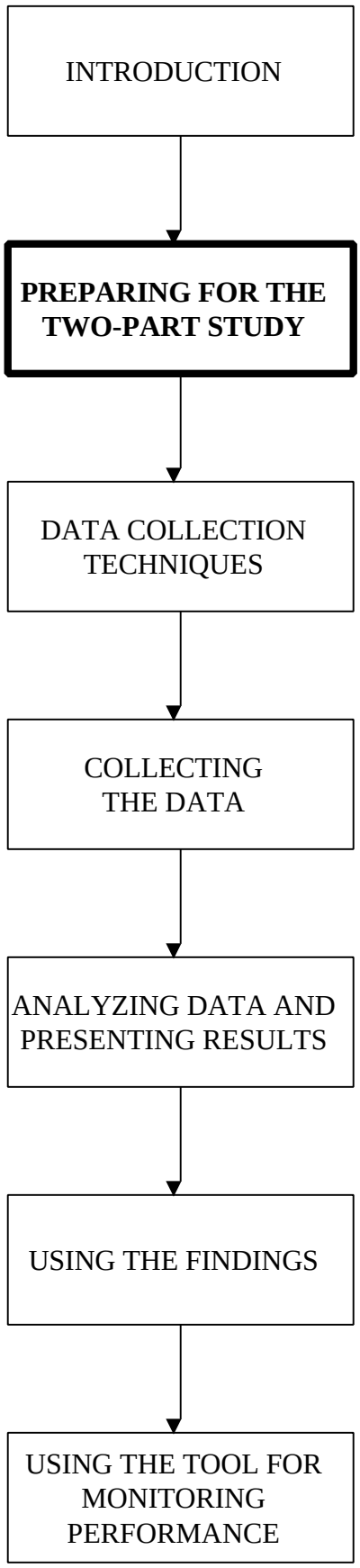
21. Percentage of encounters diagnosed as measles that are prescribed vitamin A

22. Percentage of encounters diagnosed as anemia that are prescribed iron

23. Percentage of encounters diagnosed as having very low weight for age that are counseled on feeding

24. Percentage of prescribed antibiotics dispensed correctly (i.e., the required quantity of medication to complete the standard course of therapy, as well as the correct drug, dosage strength, and regimen)

As part of the DUS, some study investigators may want to assess the skills of health workers for IMCI at the health facility level. Key indicators have been developed by WHO, UNICEF, USAID, and others. Using these indicators is optional. They have been included in Annex 3 for those researchers who may want to use the DUS as an opportunity to validate or compare indicator results from other surveys of health worker skills. The DMCI data collection forms can be easily adapted to collect these data.


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 2.

PREPARING FOR THE TWO-PART STUDY

This manual is intended as a tool to assess the drug management system in support of IMCI. The DMCI tool is an indicator-based, two-part study. Although the investigators may decide to conduct only one part of the study, the general approach to a systematic assessment requires answers to the following questions:

Availability

1. Are the drugs and medical supplies required to treat children from two months to five years old available in public health facilities?

2. What are the determinants of product availability in the public sector and what can be done to bring about improvement?

Use

1. What are current prescribing practices for important childhood illnesses?

2. Are the current prescribing practices clinically appropriate?

3. How does the drug cost of current practices for treating IMCI health problems compare to what the cost would be if IMCI treatment guidelines are followed?

4. Are drugs required to treat children from two months to five years old available and affordable in the private sector?

As part of the preparation to conduct the studies, two tasks must be completed: gathering background information and preparing an overview of the MOH drug management operations. This information will be useful in training data collectors and in putting the findings in the proper context.

Gathering Background Information

As mentioned above, there are certain figures, rates, and IMCI statistics that are important to the study of IMCI drug management. Investigators should collect and record the following data, shown in Table 1, at the very outset of the work and before the start of data collection.

Table 1. Background Information

Background Information
Prevalence and incidence of the IMCI health problems to be studied
Dates covered by the government fiscal year
Exchange rates of local currency for U.S. dollars for the data collection periods
Inflation rates for the previous five years
National and regional population figures
Rates of population increase

Preparing an Overview of MOH Pharmaceutical Management Operations

To efficiently carry out the two-part study, including interpreting the results and making recommendations for supply system improvement, it is essential to have a good understanding of current drug management operations. At a minimum, this should include qualitative descriptions of major problems that affect the movement of drugs through the procurement and distribution system and the information listed in Table 2 (see Annex 5 for data collection forms).

Table 2. MOH Pharmaceutical Management Operations

MOH Pharmaceutical Management Operations
Numbers and distribution of MOH health facilities, pharmacies, and warehouses
Numbers and distribution of drug retail outlets
Numbers and distribution of drug wholesalers, distributors, and manufacturers
Diagram showing system of drug procurement and distribution for IMCI drugs. The diagram should also include the offices responsible for managing procurement of IMCI products (by both purchase and donation), storage facilities, and health facilities.
List of sources of IMCI drugs flowing through the distribution system, and estimated values for each source, including budgets and contributions of donors and nongovernmental organizations (NGOs)
Summary of transport arrangements linking storage and health facilities. This should be as specific as possible, indicating numbers and types of vehicles available by geographic zone. If transport is through contract arrangements with parastatal or commercial agencies, describe those arrangements and indicate the budgets.
Copy of national drug formulary/essential drugs list or total number of IMCI drug products plus total number of all drug products on the list
System(s) for recovering the cost of drugs dispensed in MOH health facilities
List of all brand names in the country
Document that identifies which drugs are available at each level

In most countries, investigators will gather all of these items through interviews and document review. The best approach is to prepare a plan for collecting this information (see Table 3).

Table 3. Plan for Collecting Information to Provide an Overview of Drug Management Operations

Information Required	Whom to Ask/Interview	What Document to Review or Data to Collect
Organigram	Central Health Administration, Pharmaceutical Section	Organizational structure of health system including job titles and names of persons
Drug sources	Central Warehouse Administration	Invoices of drug orders and receipts
Central/District budgets	Central and District Health Administrative Offices	Budgets for last two years plus current year
Warehouse distribution	Central/Regional Warehouse Administration	Distribution plan: list of pharmacies and health centers, indicating flow of drugs
Transport arrangements	Central/Regional Warehouse Administration	Transportation schedule for all pharmacies and health centers, indicating how drugs are delivered
Major procurement problems	Central/Regional Warehouse and Pharmaceutical Section of Central Health Administration	Reports of past tenders, drug orders, and receipts; interviews with section director and warehouse director
Major distribution problems	Central/Regional Warehouse and Pharmaceutical Section of Central Health Administration	Reports of distribution problems; interviews with section director and warehouse director

Planning the Study

The two-part study collects data from four different settings: central level, regional level, health facilities, and drug retail outlets. Each part addresses some aspect of the questions listed at the beginning of this chapter and, when viewed together, provide a comprehensive assessment of the IMCI drug management situation.

Personnel to Conduct the Assessment

RPM's experience in conducting a countrywide assessment of the drug management system suggests that the most practical way to carry out this type of study is for two or more experienced investigators to work together over a period of four to six weeks. An ideal combination would include the following:

? A *pharmaceutical management specialist* to take charge of study coordination and data collection for logistics at the *central and regional* levels. For this, familiarity with pharmaceutical policy, logistics management, procurement, and budget issues would be most useful.

? A *health care provider* such as a physician, pharmacist, or nurse to take charge of the surveys to be carried out at the *health facility* and *retail outlet* levels. For this, familiarity with pharmaceutical products and work routines in health facilities would be an asset.

? The work of the investigators is supplemented by a team of data collectors who visit medical stores, health facilities, and drug retail outlets.

Selection of Target Sites

The data collection takes place at the central level, central and regional medical stores, health facilities, and retail outlets. Table 4 provides a list of data collection sites that should be included to conduct both studies.

Table 4. Data Collection Sites for Each Part of the Assessment

Study	Data Collection Sites
Drug Availability Study	Ministry of Health Central Office
	Ministry of Health/Central Medical Stores
	Regional Medical Stores
	Health Facilities
Drug Use Study	Health Facilities
	Drug Retail Outlets

Conducting an assessment in all these sites may look difficult, but in practice the entire set of 20 DMCI indicators can be sorted into two groups, which constitute two distinct data collection efforts:

? At the *central and regional levels*, data are collected for seven DAS indicators, of which two are collected through structured interviews and document review, and five through physical inventory and stock record review at the central and regional medical stores and health facilities.

- At the *health facility and retail outlet levels*, data for five DAS indicators and thirteen DUS indicators are collected through sample surveys. The health facility data collection effort requires organizing a survey to collect different types of data in 20 sites. The survey includes physical inventory and stock record review, patient record reviews, direct observations, exit poll interviews, and simulated purchases. A sample of 20 drug retail outlets are surveyed through interviews and simulated purchases.

After completing the two preparatory tasks previously discussed, the next activity is to plan the study and to develop a preliminary budget. The financial and human resource requirements may be reduced if only one part of the study is carried out at a time. However, in general, it is more cost-efficient to consolidate the data collection for the two studies into one overall process. Therefore, this manual will provide guidance for planning and carrying out both studies. The study plan consists of three steps:

1. Appoint investigators and assign responsibilities;
2. Plan data collection; and
3. Develop the sample design.

Step One: Appoint Investigators and Assign Responsibilities

The investigators will spend about one week planning the study, two to three weeks in data collection and two to three weeks analyzing data and writing the report. The basic organizational strategy is to approach the assessment as two separate data collection efforts:

- Central and regional level data collection, and
- Sample survey of health facilities and drug retail outlets.

As described earlier in the "Personnel to Conduct the Assessment" section, each of the two investigators should be in charge of one of the data collection efforts. Specifically, the *pharmaceutical management specialist* should be in charge of organizing the collection of central and regional data and the *health care provider* should be in charge of the surveys of health facilities and drug retail outlets. Actual data collection may be largely or entirely handled by a team of data collectors.

Each of the investigators should be responsible for carrying out the preparatory steps for his or her respective data collection areas, as described earlier in this chapter. Another important planning assignment is preparation of a budget for the assessment. This should be a collaborative effort and, at a minimum, involve both investigators. The budget should include a detailed listing of the costs to be incurred. For example:

- Salaries of investigators and data collectors
- Preparation and reproduction of data collection forms
- Communications with district and local authorities
- Training of data collectors

- ? Travel and per diem for the investigators
- ? Travel and per diem for data collectors
- ? Data entry costs
- ? Other costs during the study

Step Two: Plan Data Collection

All of the data required at the central level should be available in the capital city, and most of it should be obtainable through structured interviews and document review. Most of the vital statistics and background information in Tables 1 and 2 of this chapter will be collected at the central level. Data collection at the levels of the health facilities and drug retail outlets will require a visit to each health facility and drug retail outlet included in the sample.

Two types of data collection instruments are required for carrying out the studies described in this manual. One is central and regional level data collection checklists and questionnaires and the other is data collection forms for health facilities and drug retail outlets. Sample checklists, questionnaires, and forms are listed in Table 5 and are presented in the *Data Collector's Guide*.

Table 5. Summary of Data Collection Instruments Required by Each Study

Drug Availability Study
DAS-1: General Data Collection Preparation Checklist
DAS-2: Inventory Data Form
DAS-3: Stock-Out Data Form
DAS-4: Vaccine Data Form (Optional)
DAS-5: International Price Comparison Form
Drug Use Study
DUS-1: Medical Records Review Form
DUS-2: Observation of Health Workers Data Form
DUS-3: Exit Poll Interview Form
DUS-4 A-C: Simulated Purchase Data Forms

Step Three: Develop the Sample Design

Developing the sample design is discussed in detail in this chapter under the section "Selecting Data Collection Sites."

Adapting the Tool

To adapt and test the data collection instruments, follow these procedures:

- ? **First**, one of the investigators should review the sample data collection instruments and identify any terms, references, or questions that are not applicable to the country-specific

setting. For example, some countries may use the terms *central, regional, district,* and *community* to describe the levels of MOH facilities, while others may use the terms *national, provincial,* and *local* for MOH levels. The suggested changes should then be reviewed by the other investigator (or other study team members) and a consensus reached on the needed changes. Where necessary, add the DMCI tracer drug products.

? **Second**, visit a few health facilities and test the data collection instruments and the methods for collecting the data as described in this chapter.

? **Third**, revise the data collection instruments and, if necessary, the data collection methodology, to ensure familiarity with the entire data collection process and confirm readiness to train data collectors to do their job.

N **REMEMBER**

It is essential to understand that all of these are sample forms, and although they have been used in a number of countries, they still must be tested and adapted prior to launching data collection activities. Keep in mind that if forms are modified to suit local needs there may be software implications. It is imperative that information not be deleted from the forms. Additions to the forms are acceptable, although the additional data will not be entered in the software.

Preparing the List of DMCI Tracer Drugs

Some of the indicators are measured on the basis of a list of selected drugs, vaccines, and essential supplies. This list may also be called "a tracer product list." There is no "universal" tracer product list. The DMCI tracer drug list will be used at the central, regional, health facility, and retail levels to collect data for deriving inventory management and price indicators. The DMCI drug list in Table 6 is a sample tracer product list, adapted from the *Guide for the Introduction of Integrated Management of Childhood Illness,* for the five IMCI health problems.[1] It also includes polio, measles, and DPT vaccines and a few essential supplies. The sample DMCI tracer drug list should be adapted to the country-specific setting.

It is important to note that the IMCI drug supply should not be a separate supply system. Since most of the drugs for IMCI are essential to primary health care and are used outside the IMCI context, they should be integrated into the national drug supply system to avoid duplication.

WHO-sponsored IMCI training for health workers includes information on the use of first- and second-line treatments. Understanding the need for and proper selection of second-line therapies is essential in any clinical setting. Health workers must know effective second-line treatments

[1]Support for Analysis and Research in Africa (SARA); Health and Human Resources Analysis for Africa (HHRAA); USAID, Africa Bureau, Office of Sustainable Development in collaboration with Basic Support for Institutionalizing Child Survival (BASICS). December 1997. Guide for the Introduction of Integrated Management of Childhood Illness. Washington, D.C.: SARA project.

when the first line therapy fails or is not available. Also, selecting an appropriate treatment may depend on more than just the availability of a first-line therapy. Other patient- and drug-related variables must be considered. For the purposes of the DMCI tool, the sample list of DMCI tracer drugs is limited primarily to first-line treatments.

Preparing a DMCI tracer drug product list is a two-step process:

1. Use the methods recommended by WHO/CHD *IMCI Adaptation Guide* to adapt the list in Table 6 to the specific country setting.[2]

2. Gather a group of local IMCI experts to review the list created in the step above and prepare a list of commonly used products that should be available in the stores and health facilities.

N REMEMBER

This sample DMCI tracer drug list must be adapted and finalized in terms of local products used, dosage forms, and strengths, before using it in the studies.

Presented below is a sample list of drugs and supplies that can be used as a tracer list. The list is meant only as an example. For some of the drugs presented in the sample tracer list, more than one strength and/or formulation of the drug is presented. For example, co-trimoxazole is presented as tab 20/100 mg, OR tab 80/400 mg, OR syrup 40/200 mg per 5 ml. When adapting the DMCI tracer drug list and preparing the data collection forms, only one unique formulation (the one most readily available) should be selected. If more than one strength and/or dosage form of a drug is included on the tracer list, it should be listed as a separate drug on the data collection form to ensure accuracy of the data.

Data collection forms DAS-2, DAS-3, and DAS-5 use the DMCI tracer list. The sample data collection forms list only one form (strength and dosage form) of a particular drug per line. Once the tracer list adaptation process is complete, the data collection forms should be revised to reflect the adapted, country-specific DMCI tracer list of drugs and supplies.

[2]World Health Organization/Division of Child Health and Development. June 1997. *IMCI Adaptation Guide.* Parts 1–4. Working Draft Version 3: For Limited Distribution Only. Geneva: WHO/CHD.

Table 6. Sample List of DMCI Tracer Drugs and Supplies

No.	Product	Condition
1.	Oral rehydration salts	Diarrhea, dehydration
2.	Co-trimoxazole tab 20/100 mg, or tab 80/400 mg, or syrup 40/200 mg per 5 ml	ARI, dysentery, cholera
3.	Amoxicillin tab 250 mg or syrup 125 mg per 5 ml	ARI
4.	Chloramphenicol IM 1000 mg in 5 ml sterile water	ARI
5.	Gentamicin IM 20 mg per 2 ml vial or 80 mg per 2 ml vial	Sepsis, pneumonia
6.	Benzylpenicillin 1,000,000 IU	Sepsis, pneumonia
7.	Nalidixic acid tab 250 mg	Dysentery
8.	Erythromycin tab 250 mg	Cholera
9.	Chloroquine tab 150/100 mg base	Malaria
10.	Sulfadoxine/Pyrimethamine tab 500/25 mg (Fansidar)	Malaria
11.	Quinine IM 300 mg/ml or 150 mg/ml	Malaria
12.	Mebendazole tab 100 mg or tab 500 mg	Hookworm, whipworm, anemia
13.	Iron folate tab 200/0.25 mg	Anemia
14.	Iron suspension 20 mg/ml	Anemia
15.	Gentian Violet solution	Oral candidiasis, mouth ulcers
16.	Tetracycline ophthalmic ointment 1%	Eye infection
17.	Vitamin A drops 5000 IU/0.1 ml, or caps 50,000, or caps 100,000, or caps 200,000 IU	Measles, malnutrition
18.	Paracetamol tab 100 mg, or tab 500 mg, or syrup 24 mg/ml	Fever, pain
19.	Ringer's lactate or normal saline	Severe dehydration
20.	Oral polio vaccine (OPV)	[Prevention]
21.	Measles vaccine	[Prevention]
22.	DPT vaccine	[Prevention]
23.	BCG vaccine	[Prevention]
24.	Syringe and needle	[Essential supplies]
25.	Thermometer	[Essential supplies]
26.	IV sets	[Essential supplies]
27.	Nasogastric tubes	[Essential supplies]
28.	Weighing scale	[Essential supplies]

Selecting Data Collection Sites

Sampling

The goal of the sampling process is to collect enough data, in terms of the actual number of patient encounters and variety and number of sites, for the results to be considered representative of current IMCI drug availability and use within the country. This aspect of the planning process is very important and deserves careful consideration by organizers of the assessment. Failure to ensure that the data set collected is a large enough and varied enough sample to be considered representative could seriously limit the utility of the data analysis and conclusions, because the findings will not be generally representative of the country's IMCI drug management situation. The following sections address the four areas of sampling that are critical to the IMCI drug management assessment process.

To understand the approach for the study design proposed in this manual, it is important to review the purpose and intent of the IMCI drug management assessment. To summarize:

- ? The purpose of the assessment is to identify high priority problem areas that might hinder the implementation of IMCI and to point to appropriate follow-up activities.
- ? The study design is cross-sectional to establish the baseline for monitoring of future interventions.
- ? The study design is not intended to compare regions, districts, or facilities but rather to describe a reasonably representative drug management profile for the sample as a whole.
- ? The study design is intended to facilitate the logistics of the data collection effort within a reasonably short time (one day per health facility) and with limited financial resources.

The next step in the design process is the selection of patient encounters and the selection of health facilities and drug retail outlets.

N REMEMBER

This survey design task is divided into four steps:

1. **Selection of central and regional sites sample**
2. **Selection of the health facility sample**
3. **Selection of patient encounter sample**
4. **Selection of the drug retail outlet sample**

Step 1: Selection of Central and Regional Sites Sample

The exercise of constructing the overview of MOH pharmaceutical management operations often reveals that important variations exist within a procurement and distribution system, and that those differences may affect the supply of IMCI products. Some features of the system vary from region to region, facility to facility, and from prescriber to prescriber. These local variations include such items as climate, financing, sources of drug supply, ease of access to facilities, condition of inventory records, or patterns of prescribing practices.

It is important to include facilities representing all significant variants of the overall system in the sample. One way to do this is to choose four geographic areas (that is, districts or regions) in which to work, based on an informed division of the country into groupings determined by such variables as geography, socioeconomic factors, population density, or key features of the health care system. Below are some criteria for selecting four areas in a country.

- ? The capital city and the main population center (if different) should always be included as one or two of the study areas.
- ? If the country is relatively homogeneous geographically and epidemiologically, simply choose the capital city and three other regions or districts at random.
- ? If you expect varying conditions in different areas of the country to influence the way pharmaceuticals are managed, first organize all regions or districts into groups, based on these characteristics, then select the capital city and three study areas at random from these groups.

The following three examples show how geographic considerations may be used to develop a sample that is representative of the country:

Example 1:	(1) Capital city; (2) Highland agricultural district; (3) Lowland agricultural district; and (4) Arid district
Example 2:	(1 and 2) Capital city and one other densely settled urban area; and (3 and 4) Two rural agricultural districts
Example 3:	(1) Capital city; (2 and 3) Two rural districts with reasonably good transportation links; and (4) One relatively inaccessible rural district

Step 2: Selection of Health Facilities Sample

The sample size used in this manual is 20 health facilities, 5 from each of the four selected geographic regions of the country. The rationale for selecting a sample size of 20 health facilities is based on experience and the study design factors and assumptions previously discussed.

To make the actual site selections, follow these procedures:

? First, select the district hospital outpatient unit, which should always be one of the facilities selected in each study district. Select randomly if there is more than one district hospital in the district.

? Then, randomly select four other health facilities from the list of health centers in the selected district. For systems organized with only one basic tier of outpatient facilities below the district hospital (for example, rural health centers), select the other four as follows:

- If geographic distances and transportation logistics are such that all facilities can be visited and all data can be collected in one day, select four of these second level units at random, from all of those in the district.
- If transportation is more difficult, select two facilities at random, and then choose two other facilities that are geographically close to them, so that the paired facilities may be visited in one trip.

? For systems with two tiers below the district hospital level (for example, polyclinics staffed by physicians and lower level health posts staffed by paramedics), select the other four facilities as follows:

- Choose two second level health facilities at random.
- For each of those two second level health facilities choose, from among the group of third level facilities that are geographically close, one site. The result is paired sets of second and third tier facilities.

? For systems that are organized in a different way, distribute the five facilities to be studied in each district among the possible types of health facilities, according to such factors as their geographic location or patient load.

Step 3: Selection of Patient Encounter Sample

The sample of patient encounters is important for the Drug Use Study. For each IMCI health problem studied, a minimum of 600 patient encounter records must be reviewed. This is achieved by randomly selecting 30 medical records for each IMCI problem in each of the 20 health facilities. Examples of patient encounter records include daily registers, medical records, or prescription slips. The rationale for selecting a sample size of 600 patient encounters per IMCI health problem studied is based on the following statistical assumptions:

? The design is intended to estimate percentage indicators that summarize values for the whole sample with a 95% confidence interval and plus or minus 7.5% error.

? Experience has shown that the results of collecting larger samples are not more useful for identifying the main problems and, therefore, do not justify the increased time, cost, and effort.

For the Drug Use Study, ARI is further subdivided into pneumonia and no-pneumonia (cough or cold). Therefore, 1,200 ARI patient encounter records (30 randomly selected records for pneumonia and 30 for no-pneumonia [cough or cold] per facility) are needed.

N REMEMBER

The most important principle to remember in each phase of this process is *random selection*.

The simplest approach to random selection is to apply the interval method to site lists. Make sure that the site lists are complete and organized alphabetically, and select every n^{th} site, where n is determined by dividing the total number of available sites by the desired sample size. For example, if there are 40 sites available, and 4 are needed for the study, select every tenth site (n=10) on the list.

Step 4: Selection of Drug Retail Outlet Sample

The sample size for drug retail outlets is 20, 5 from each of the four geographical regions of the country. The most commonly recognized drug retail outlets are pharmacies. However, there may be other types, such as over-the-counter (OTC) drug stores and market vendors. The definition of drug retail outlet should be decided prior to data collection. It is important to obtain a clear idea of the different types of outlets operating, their relative proportions and geographic distributions, and regulations that affect what may be sold. The drug retail outlet sample should be selected to include proportional numbers of all major types. To do this, apply the principles described above for sampling different types of health facilities.

In selecting the drug retail outlet site sample, the simplest approach, from the logistical point of view, would be to choose the site that is geographically closest to each randomly selected health facility visited. Two problems with this approach are that (1) those outlets situated closest to health facilities may not be representative of all outlets and (2) in some settings where rural health facilities are located, there may be no pharmacies or other drug retail outlets. A better approach, from the point of view of representative sampling, is random selection within each of the four geographic areas in the sample design. The best way to accomplish this is to apply the systematic interval sampling method to site lists, as described under “Selection of Health Facilities Sample.”

Arranging Logistics

Scheduling

Scheduling is a complicated issue that is affected by factors such as the average time required to collect data in each site, the number of data collectors available, distances between sites, and transport arrangements. It is best to begin by thinking in terms of averages, and then make refinements by considering the geographic implications of the site sample of the study. Experience with the indicator studies completed so far suggests that, on average, about one day of data collection time and one to two days of travel time are required for completing work at one health facility.

This suggests that 12 data collectors, working in teams of 3 in the four sites, would require 10 work days each, or perhaps 11 to 12 calendar days for the whole group to travel out, complete work, and travel back. The time required for covering the drug retail outlets must also be considered. For this group of sites, however, work time is much shorter, so the main variable is geographic distribution.

Staffing

Thus far, discussions have covered the roles of the study investigators and the data collectors. Other types of staffing that may be required include one or more data collection team managers to supervise and coordinate groups of data collectors, persons to enter or process collected data, and drivers. It should be clear that the practical problems of managing a data collection schedule will be greatly simplified by employing these types of workers. Not employing them to save money will be false economy in most cases.

Transport

It is certainly faster to chauffeur data collectors directly to sites, but buses or other public transport can also be used. In some cases, combination approaches will be useful, in which some data collectors working in closely grouped sites are ferried around by drivers, while others, who are going to remote sites, take a bus. As this component is one of the most expensive of the study, the source of transport needs to be defined early on and made clear to the data collection team.

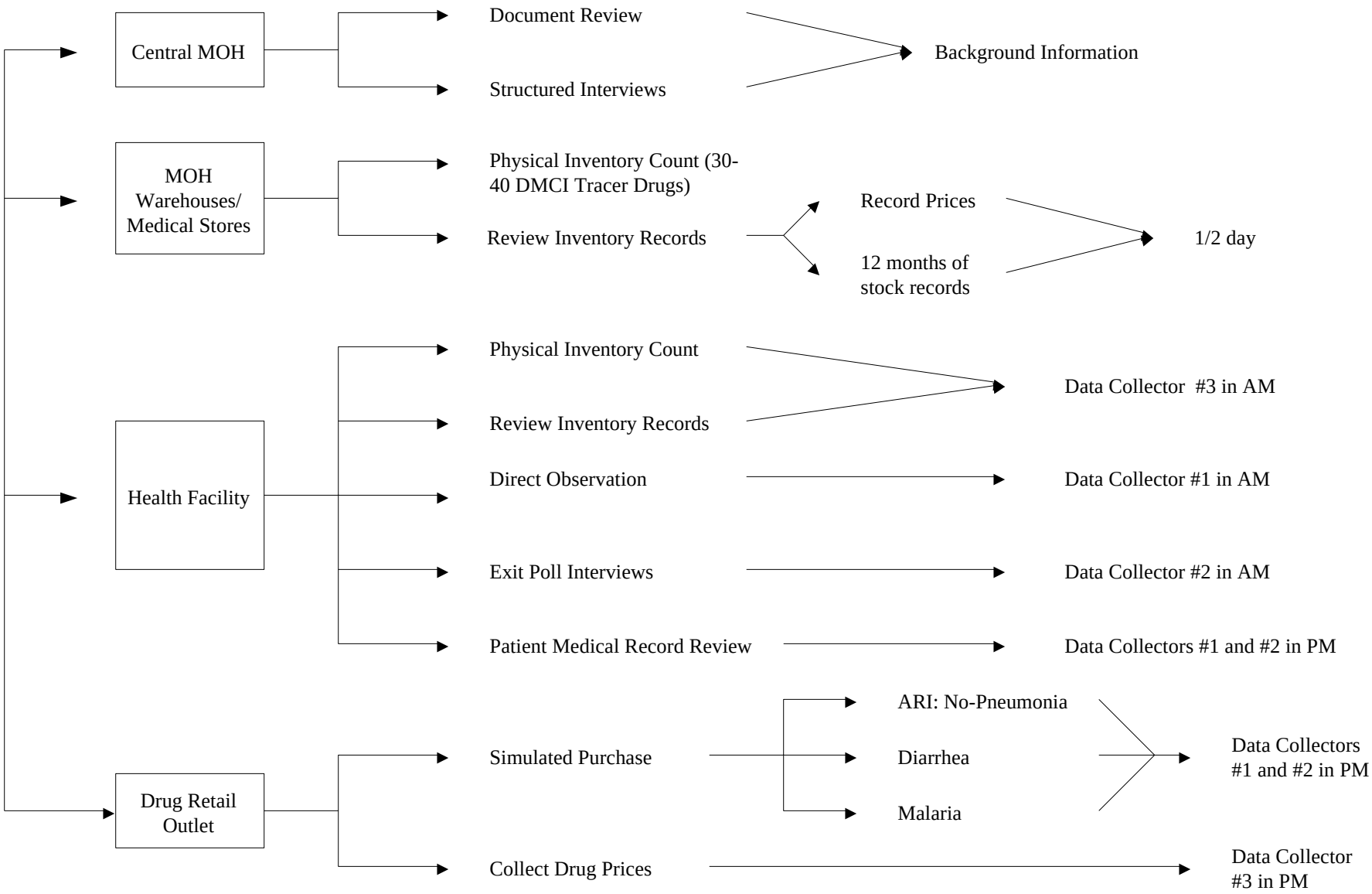
Letters of Authorization

One important detail that can cause serious problems if overlooked is letters of authorization. Each data collector, team manager, and investigator should be provided with letters from the appropriate authority (such as the MOH) introducing the bearer, requesting cooperation, and authorizing data release. Letters from different authorities may be required for visits to health facilities and drug retail outlets. Whenever possible, central level officials should inform the health facility authorities by telephone communication or radio prior to the arrival of the data collectors.

Summary of Data Collection Activities by Site

This chapter has described the different data collection activities that need to be carried out in the different target sites to complete the two-part assessment. To facilitate the planning of this effort, Figure 2 provides a graphic depiction of the entire data collection process in each of the sites. As depicted in Figure 2, data from the Central MOH and MOH Warehouses/Medical Stores can be collected prior to the field data collection at health facilities and drug retail outlets. The numbers *1*, *2*, and *3* to the far right refer to the team of three data collectors and their possible roles in the morning (AM) and afternoon (PM).

Figure 2. DMCI Data Collection Process Flow Chart



Training Data Collectors

Recruiting and Training Data Collectors

It is necessary to recruit and train two groups of data collectors as follows:

- ? one group to collect data in health facilities, and to obtain availability and price data in drug retail outlets; and
- ? another group to carry out the simulated purchases.

For the first group, the most effective data collectors will usually be doctors, pharmacists, nurses, or paramedical personnel who have worked in health facilities. There is some risk in using students or other parties who have no practical experience in working with the record keeping systems that they will encounter. The risks are that the students will have difficulty identifying the required data so the work will be unduly slow and frustrating, and this could negatively affect the quality of the data. A related problem, which could produce similar results, lies in recruiting parties, particularly some doctors, who may consider themselves too senior to carry out the relatively tedious work required.

To minimize the risks and promote productivity, a useful strategy would be to pair health care providers of different backgrounds with other workers who have experience in storage facilities. This would provide a team that has practical experience with product names as well as with both stock and clinical record keeping.

No matter who is recruited, however, it is essential that they be trained, and that the training include actual practice in filling out all forms required for both health facility and drug retail outlet data collection. Table 7 on page 41 illustrates a model training course that may be adapted to suit local circumstances. A companion document, *Data Collector's Guide for the DMCI Manual*, is available to facilitate the training of data collectors and it can serve as a guide to data collectors in their field work.

Finding data collectors for the simulated purchases poses less of a recruiting problem. No technical expertise is required to do this quick and simple work. It is, however, very important to train the data collectors through role playing, and to verify that they understand what to do by observing their performance in two or three encounters in drug retail outlets. This can be set up with the help of a sympathetic store owner whose store could be used as a training site.

Training Tips

To make sure that data are collected as intended, it is necessary to provide data collectors with adequate training and practice before they begin work. This helps build the necessary skills and confidence for the upcoming activities. In addition, using the data collection forms during training serves several purposes:

- ? Identifies and corrects questions that are inappropriate or unclear for the health setting
- ? Familiarizes data collectors with the questionnaires
- ? Provides a medium for learning and practicing data collection techniques

The amount of training will vary depending upon the caliber of personnel employed and the study methodology. For example, in-depth interviews require more elaborate training, but structured questionnaires require less training since they use close-ended questions.

To ensure that the training activity is carried out properly, the trainers should do the following in advance:

- ? Identify data collector team managers and data collectors, make assignments
- ? Identify a training venue that allows for flexibility in breaking up into small groups and lecture style presentations
- ? Make necessary travel arrangements for data collectors to get to the training venue, if necessary
- ? Identify at least one health facility and one drug retail outlet convenient to the venue where data collectors can practice their work
- ? Make sufficient copies of all data collection forms and create individualized packets (see below)
- ? Prepare practice data for use in practical exercises and role-playing
- ? Schedule training dates to allow sufficient time for all aspects of training

The data collector's packet should include the following (contents may vary depending on the country-specific situation):

- ? A copy of the *Data Collector's Guide* containing a complete set of the data collection forms
- ? Letter of introduction from a recognized authority to introduce the data collectors to the health facilities
- ? Contact information of the team manager (name, phone number)
- ? Data collection schedule
- ? Notebook for taking field notes, two pens, paper clips for securing forms

Data Collection Team Managers

Depending on the context (size of region, number of data collectors, etc.), it may be useful to build a team of managers. The team managers should meet at least one day in advance of the training in order to:

- ? Be briefed on all aspects of the study (background, objectives, methods)
- ? Review role and responsibilities of the team managers (these should be written)
- ? Review assignments of sites and data collectors
- ? Review training program

To carry out both the Drug Availability and Drug Use Studies, a team of at least three or four data collectors (with one person serving as team manager) is needed, particularly for the observation and exit interviews in health settings. For example, one option for a three-member team division of data collection responsibilities in a health facility is as follows:

One person is team manager. (S)he preselects patients that match the investigated diseases and reviews the checklists for completeness. Another data collector observes the consultation of the preselected patients, and the third one conducts the exit interview with the same patients. The team manager can collect the availability data and interview the clinic staff on standard treatments while the two other surveyors collect simulated purchase data at the drug retail outlet.

The team managers are preferably selected by the coordinator of the study and are usually senior personnel who have extensive knowledge of the health system or who have worked or are still working in health facilities. The decision to have data collection teams of three or four people should depend on the country-specific situation and should be determined by the study coordinator.

Training Techniques

To assist in the training process, a few general points about training, adapted from the *Drug Supply Management for First-Level Facilities Training Guide* developed by BASICS and WHO (1996), follow:

Help Data Collectors to Use the Forms Correctly

There may only be a need to explain a small bit of information for the data collector to use a particular form correctly. However, if the data collector is not familiar with certain terms or items on the forms, clarify them. There is a good chance that if one data collector is not familiar with the terms or items, others are having the same problem.

Check the Data Collector's Understanding

A data collector may not understand a procedure and may need individualized help. The data collector may be inexperienced, tired, or less educated than the other data collectors. Be patient and—

- ? Show the data collector where to find the material in the DMCI *Data Collector's Guide.* Explain that all the necessary information can be found in the Guide. Ask him/her to reread the appropriate part.
- ? Ask the data collector why he/she is having a problem. Listen carefully. Help the data collector to think through the problem and propose his or her own solutions.
- ? Encourage the data collector to ask specific questions about how to perform a particular data collection technique.

Giving Feedback

The data collectors will be involved in active learning throughout the workshop. Give them feedback as they review the forms and practice the different data collection techniques. Always give constructive feedback. The feedback should occur while or after the participant does the activity, such as completing a question-and-answer exercise, using a checklist, or acting in a role play. It should include showing the participant how to do the activity correctly, and giving the participant practice doing the activity him/herself.

Steps for Leading a Simulation or Role Play

Several of the data collection techniques will require data collectors to observe and interview health care workers and caregivers of sick children. Some data collectors will also be required to pose as caregivers to conduct the simulated purchases. Role play can be a useful training tool to help data collectors become familiar with such data collection situations. To conduct the simulation or role play:

1. Introduce the activity and state its purpose. Give data collectors as much instruction and background information as necessary. Tell them to refer to their *Data Collector's Guide.* If necessary, demonstrate how to perform the activity.

2. Assign individual roles and responsibilities. Hand out any necessary supplies or props.

3. Give data collectors enough time to prepare. You can estimate the time if you have practiced the activity yourself prior to the training workshop. Remind data collectors to work together to develop simulations and role plays.

4. Arrange the room so that the presenting group is separated from the others. Make sure everyone is able to see the simulation or role play.

5. After groups are prepared, introduce the simulation or role play.

   ? In a simulation, describe the order in which the groups will present their work.
   ? In a role play, introduce the players and their parts. Remind those data collectors involved in a role play to speak loudly so everyone can hear.

6. Begin the activity. Ask the groups to present the simulation or role play.

7. Instruct data collectors observing the activity to take notes during the activity for later discussion. Interrupt only if participants are not able to complete the activity.

8. When the activity is finished, thank the group. Ask participants to comment on aspects of the activity that were successful. Then ask about and discuss those parts of the activity that could be improved. Be supportive.

9. Lead a discussion among the data collectors. Conclude the activity by asking data collectors what they have learned.

Following are brief "how to" instructions for data collectors. Review these instructions with the data collectors. The simulation and/or role play exercises can be used to test how well data collectors perform different data collection techniques.

To collect data using the **direct observation** technique, do the following:

- ? Review the DUS-2: Observation of Health Worker Data Form before the consultation begins.
- ? Ask the health worker whom you will observe to explain the purpose of your presence in the examination room to the patient and caregiver, i.e., conducting a health care survey.
- ? Fill in the information at the top of the form to identify the facility, patient, and data collector.
- ? Once the consultation begins, do not speak, since it might interfere with the patient-provider relationship.
- ? Start counting the time required for the consultation.
- ? Record the patient's reason for coming to the health center, i.e., the health problem.
- ? During the consultation, indicate which questions the health worker asked the patient or caregiver.
- ? During the consultation, record the information about all drugs prescribed by the health worker.
- ? Record the diagnosis made by the health worker.
- ? Record the total amount of time required for the consultation.
- ? Do not leave any rows blank in Table 1 on the form. Do not leave any blank cells in Table 2 unless the health worker did not provide the information to the caregiver.
- ? Give the completed data forms to the team manager for quality checking before leaving the facility.

To collect data using the **interview** technique, do the following:

- ? Review the DUS-3: Exit Poll Interview Form before the interview begins.
- ? Wait for the patient and caregiver to leave the health center.
- ? Preference is to interview those patients who were participants in the health care study.
- ? Explain the purpose of your interview, i.e., conducting a health care survey.
- ? Fill in the information at the top of the form indicating the facility, patient, and data collector.
- ? Ask caregiver what was the chief complaint or reason for the consultation, i.e., the health problem.
- ? Ask the caregiver, "What drugs were prescribed during the consultation and how are you going to give the drugs to your child?"
- ? Record each drug mentioned by the caregiver and how they will be given to the patient.

- ? For each drug mentioned, ask if the caregiver already received the drug from the health center or pharmacy and record on the form.
- ? If the caregiver does not know an answer, write *DNK*.
- ? Give the completed data forms to the team manager for quality checking before leaving the facility.

To collect data using the **record review** technique, do the following:

- ? Review the forms DAS-2, DAS-3, DAS-4, and DUS-1 before starting data collection.
- ? Based on sample size and time frame of the study, select the MOH records to be studied.
- ? Record the facility, data collector, and record system information at the top of the forms.
- ? For each tracer drug on the list, record all requested information.
- ? On form DUS-1, fill in each drug and the requested prescribing information as ordered in the patient record. Interview the prescriber or medical head of the facility to complete missing information.
- ? Do not leave any spaces blank unless the information is not documented in the records you are reviewing or not available for use in the study.
- ? Give the completed data forms to the team manager for quality checking before leaving the facility.

To collect data using the **simulated purchase** technique, do the following:

- ? Review forms DUS-4A, DUS-4B, and DUS-4C before beginning data collection.
- ? Review the Scenarios for Simulated Purchases for No-Pneumonia (Cough or Cold), Diarrhea, and Malaria located in the *Data Collector's Guide*, before beginning data collection.
- ? Based on the sampling plan established for the study go to the drug retail outlet.
- ? Make sure you have enough money to purchase any drugs recommended by the drug seller.
- ? Enter the drug outlet as would any normal client.
- ? Describe the condition of your child to the drug seller and ask for recommendations.
- ? Purchase any drugs or supplies recommended by the drug seller.
- ? Immediately upon leaving the drug outlet, record the questions asked and recommendations made by the drug seller on forms DUS-4A, DUS-4B, and DUS-4C, as appropriate.
- ? For each drug recommended, record the drug name and how the drug seller recommended giving the drug to the patient, i.e., dosage, frequency, duration, special considerations.
- ? Answer all questions on the forms and do not leave any spaces blank about how to give a drug, unless the drug seller did not give that information.
- ? Give the completed data forms to the team manager for quality checking before leaving the location.

Data Collection in Health Facilities—Practice Session

A half day should be dedicated to practicing data collection in a local facility. Data collectors should be split up into small groups and assigned the task of completing some of the forms. They should be required to debrief the other data collectors afterwards on the experience.

Once back in the training venue, the groups should present their "findings" with respect to ease of finding the required data, data entry, time required to complete the task, and other observations. After all groups have completed this, groups should exchange their completed data collection forms. Groups will review the forms and critique them for completeness, legibility, and other relevant observations.

Testing Reliability of Data Collected on Observation Checklists

Even though you may have confidence in the ability of the surveyors you have selected to participate in a study, data collection can be a major problem when using observation checklists, such as form DUS-2. For example, when recording data on an observation checklist, the surveyor checks off what (s)he *thinks* (s)he sees and hears, instead of what may actually be taking place or being said.

For that reason, initial training should include checking for intra- and inter-reliability of surveyors. The challenge of training surveyors in the use of observation checklists is twofold:

- ? To ensure that one surveyor consistently checks the same thing every time (s)he observes the same thing (**intra-surveyor reliability**)
- ? To ensure that different surveyors consistently check the same answer every time they observe the same thing (**inter-surveyor reliability**)

The goal of reliability checking is to obtain more than 90% intra- and inter-surveyor reliability in three consecutive role plays before the surveyors go out for data collection. Use the form that follows these instructions to record results of role playing during surveyor reliability checks.

Instructions for using the Reliability Check Form for Data Collectors' Training:

1. On the copies of form DUS-2 that will be used for training, number the individual items observed.
2. Write the numbers of all the observation questions in the far left column labeled *Quest. #*
3. Place the code or name of each surveyor in the columns immediately below *Data Collector Code or Name*, one per column.
4. Record the number of the role play in the space at the bottom of the form beside the label *Number of the reliability check*, since the role plays will be conducted three times.
5. Have the surveyors observe a role play, while filling out the data observation questionnaire (form DUS-2). A referee observes the same role play and fills out an

observation questionnaire that will serve as the reference or standard for comparing the surveyors' answers.

6. Collect all questionnaires.
7. Write the referee's answer to each question in the column labeled *Ref. Ans.* The referee should be experienced in observation of health workers.
8. For each question write each surveyor's answer to the question in the column under his or her code or number.

Calculate the **inter-surveyor reliability** as follows:

For each question, count how many surveyors gave the same answer as the referee, and count the total number of surveyors. Calculate the inter-surveyor reliability (Q%) for each question using the following formula:

$$Q\% = \frac{\text{number of surveyors with the same answer as the referee}}{\text{total number of surveyors}} \times 100$$

Place the result for each question in the column labeled *Q %*. A question with less than 90% reliability should be reviewed with the group for clarity of the instructions. It may be necessary to adapt the question. This should be repeated until all questions get an acceptable percentage (usually >90%).

Calculate the **intra-surveyor reliability** as follows:

For each surveyor, count the number of questions where the surveyors answered the same as the referee, and count the total number of questions on the form. Calculate the intra-surveyor reliability (S%) for each question using the following formula:

$$S\% = \frac{\text{number of questions where surveyor answered same as the referee}}{\text{total number of questions on the form}} \times 100$$

Place the result in the row labeled *S %*. This is the intra-surveyor reliability for each surveyor. A surveyor who has less than 90% should receive additional training before continuing.

Calculate the **average reliability for the group of surveyors** as follows:

$$\text{Average \% (reliability)} = \frac{\text{sum of all S\%}}{\text{total number of surveyors}} \times 100$$

Place the average % in the space at the bottom of the form beside the label *Reliability (avg. % for the group).* The role plays should be conducted a total of three times, and surveyors should obtain more than 90% for three consecutive simulations before deciding that the observation questionnaire is well understood.

At the end of the training, surveyors who do not have a score of 90% either should not be used as surveyors or should be assigned to tasks that don't involve filling out the observation checklist.

Since reliability checking is practically the only measure for the quality of data obtained during the direct observation technique, it pays to spend a little more time during training to reach the necessary reliability level before going to the field for data collection.

Note: The same reliability exercise can be applied during training for other data collection techniques like interviews and record reviews. However, inter- and intra-surveyor reliability should be close to 100% for these techniques before sending surveyors to the field.

Reliability Check Form for Data Collectors' Training

Quest. #	Ref. Ans.	Data Collector Code or Name												Q %
S%														
Number of the reliability check:									**Reliability (avg. % for the group):**					

Training Schedule

The following is a schedule of training activities to use in training data collectors for the two-part study of health centers and drug retail outlets.

Table 7. Illustrative Four-Day Training Course for Data Collectors in Health Facilities and Drug Retail Outlets

Day	Training Activities	Time
1	1. Opening—Introduction of the data collectors	1-2 hours
	2. General presentation:	
	? purpose of the survey: to document drug availability and drug use for IMCI health problems	
	? training objectives: to familiarize data collectors with survey questionnaires and data collection techniques	
	? introduction of the *Data Collector's Guide*	
	? where to collect data: health facilities and drug retail outlets	
	? data collection techniques to use: direct observation, interviews, simulated purchases, record reviews	
	? discuss data collectors' expectations or concerns	
	3. Work schedule and compensation	
	4. Location of sites to be surveyed	
	5. Review survey form DAS-1: General Data Collection Preparation Checklist	2-3 hours
	6. With the remaining survey forms grouped according to where data are to be collected, review them one by one as follows:	
	<u>Central Medical Stores/Regional Medical Stores</u>	
	? DAS-2: Inventory Data Form	
	? DAS-3: Stock-Out Data Form	
	? DAS-4: Vaccine Data Form (optional)	
	<u>MOH Health Centers</u>	
	? DAS-2: Inventory Data Form	
	? DAS-3: Stock-Out Data Form	
	? DAS-4: Vaccine Data Form (optional)	
	? DUS-1: Medical Records Review Form	
	? DUS-2: Observation of Health Workers Data Form	
	? DUS-3: Exit Poll Interview Form	
	<u>Drug Retail Outlets</u>	
	? DUS-4A: Simulated Purchase Form for No-Pneumonia (Cough and Cold) in Private Pharmacies	
	? DUS-4B: Simulated Purchase Form for Diarrhea in Private Pharmacies	
	? DUS-4C: Simulated Purchase Form for Malaria in Private Pharmacies	

Day	Training Activities	Time
1	7. Central medical stores/regional medical stores visits: ? practice filling out survey forms DAS-2, DAS-3, and DAS-4 (optional) ? practice role play for forms DAS-2, DAS-3, and DAS-4 (optional) in small groups 8. MOH health center visits: ? practice filling out survey forms DAS-2, DAS-3, DAS-4 (optional), DUS-1, DUS-2, and DUS-3 ? practice role play for forms DAS-2, DAS-3, DAS-4 (optional), DUS-1, DUS-2, and DUS-3 in small groups 9. Drug retail outlet visits: ? practice filling out survey forms DUS-1, DUS-4A, DUS-4B, and DUS-4C ? practice role play for forms DUS-4A, DUS-4B, and DUS-4C in small groups 10. Discuss policy of patient confidentiality	2-3 hours
2	1. Practice how to draw a sample of patient encounters from health facility records _____ 2. Visit predetermined health center and collect a complete set of data using survey forms DAS-2, DAS-3, DAS-4 (optional), DUS-1, DUS-2, and DUS-3	1 hour _____ 5-6 hours
3	1. Debrief on health center practice visits: critique performances and troubleshoot problems 2. Discuss revisions of forms if revisions are necessary as a result of the practice visits 3. Role play in small groups—check reliability (quality) of data collector knowledge, skills, and abilities for filling in the data collection forms _____ 4. Visit predetermined drug retail outlet and collect a complete set of data using DUS-1 (prices), DUS-4A, DUS-4B, and DUS-4C	3-4 hours 2-3 hours

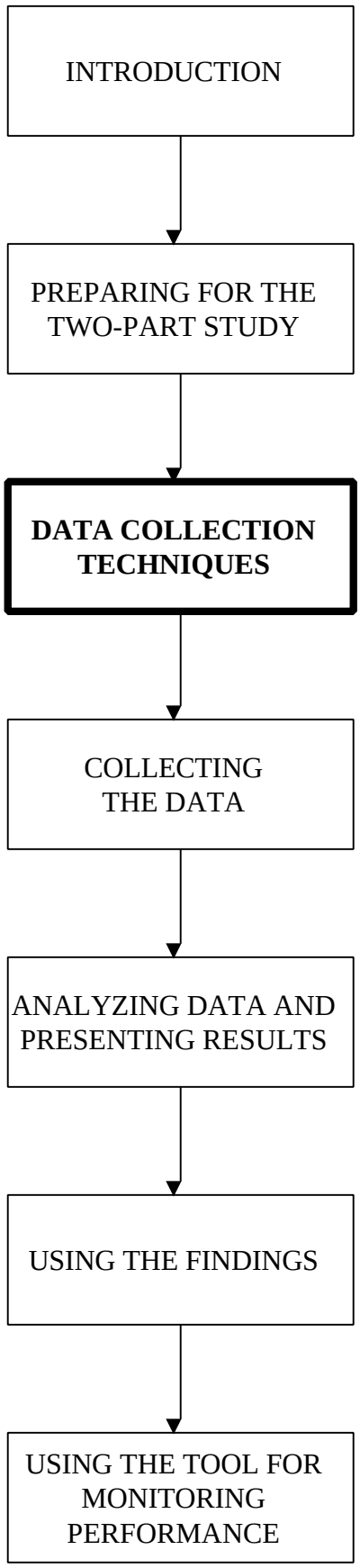
Day	Training Activities	Time
4	1. Debrief on drug retail outlet practice visits: critique performance and troubleshoot problems	1-2 hours
	2. Discuss revision of forms if any are necessary as a result of the practice visits	
	3. Role play in small groups—check reliability (quality) of data collector knowledge, skills, and abilities for filling in the data collection forms	
	4. Assign data collectors to teams and appoint team manager for each team	3-4 hours
	5. Discuss purpose of regular team meetings during data collection: to discuss successes, problems, and how to overcome data collection problems	
	6. General review and open questions	
	7. Review supervisory role with all team managers	4-5 hours
	? periodic observation of data collectors	
	? ensure completeness of data collection forms before leaving the facility	
	? how to fill out shaded areas of data collection forms and establish standardized coding for identifying individual data collectors, patient records, encounters, etc.	
	? how to select an alternate health center when one becomes inaccessible to data collectors	
	? cleaning up data forms before data analysis	

Training Data Entry Staff

It is necessary to recruit and train at least one person to enter the collected data into the DMCI software. For consistency, it is best if one person performs all of the data entry, but if that person's availability is questionable, you should recruit and train two people so that you have a backup. It is crucial to recruit a data entry person with solid computer skills and a practical experience in data entry. It is essential to employ a data entry person who is experienced with Epi Info. Experience with computers and/or data entry is more important than good typing skills. While this represents an additional expense, it is more cost-effective over time.

It is essential that the data entry person be trained to use the software and that the training include actual practice with all of the forms in the manual. It is very helpful if the data entry person can attend the data collector training, especially those sessions addressing the forms. The study organizer must review Annexes 6 and 7 to familiarize him- or herself with the DMCI software program before conducting the training. The training should be conducted while the data collectors are in the field. The data collection forms used in the data collector training can be used as samples for training the data entry person. The data entry person should be instructed to put his or her initials on each data collection form in a designated spot (determined by the study coordinator) to indicate that the data entry is completed for that form.

Because the data entry work is specialized and can require frequent consultation with the coordinator, it is advisable that the coordinator and the data entry person work closely together, preferably in the same location. Working in the same location is also helpful because both people may need access to the data collection forms. In addition, if the study coordinator is readily accessible, that should help minimize the data entry person's need to make his or her own judgments on data entry decisions. It is best if decisions about questionable issues or data are handled by the study coordinator.


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 3.

DATA COLLECTION TECHNIQUES

Data for calculating the 20 indicators are collected using seven different data collection techniques at central, regional, health facility, and drug retail outlet levels. The seven techniques are: document review, structured interviews, physical inventory checks, records review, direct observation, simulated purchases, and exit polls. Some of the techniques will be used at more than one level. Table 8 lists the data collection techniques used in each study. *The Data Collector's Guide* provides data collection forms and checklists as well as a detailed description for each technique.

Table 8. Data Collection Techniques

Study	Techniques
Drug Availability Study	Structured interview
	Document review
	Inventory check in medical stores
	Inventory check in health facilities
Drug Use Study	Patient medical record review
	Simulated purchases
	Interviews of medical personnel
	Direct observation
	Exit poll interviews

Structured Interviews

Structured, key-informant interviews are person-to-person discussions used to gather information and documentation. The most important aspect of the interview is asking questions in a structured or standardized way. Using these questions during the interview will help the data collector/interviewer organize his or her thoughts. The questions can also serve as a checklist to ensure that all the topics for which the data collector needs information are covered. To carry out this work it is important to keep two points in mind:

1. Informants should be selected for their knowledge about the issues and their ability to provide current and reliable data. The selection of informants should also take into consideration their official position and factors that may bias their views.

2. To the extent possible, data collected through interviews should be verified through review of documents or records.

Document Reviews

Chapter 2 outlines several planning activities to conduct the two-part study (see Table 3). Reviewing documents to collect country-specific vital statistics and background information, as well as data on MOH pharmaceutical operations, is an important part of the planning. Tables 1, 2, and 3 provide guidance on what information to collect. It is important to remember that information gathered during one-on-one interviews should be confirmed or supported through

documentation. Also, always make sure to note the date and have an understanding of the context (e.g., regional versus national, public versus private) for the data or documents collected.

Physical Inventory Checks

The physical inventory and review of records takes place in MOH storage and health facilities as well as drug retail outlets. The physical inventory and review of stock records serve as a "point-in-time" check that is carried out by examining the bin card and the stock card records of each DMCI tracer drug item in stock. A physical count of stock on hand will be necessary to check that the stock balance records are correct. When taking a physical count, do not open closed containers. The amount present in open containers should be estimated. Conducting the physical inventory check in MOH facilities will provide an additional form of evaluation that may reveal defects in the warehousing system and identify surplus, expired, and obsolete stock.

Patient Medical Records Reviews

Patient medical records serve as the primary source of retrospective data on the prescribing practices used to treat IMCI conditions. Chapter 2, Preparing for the Two-Part Study, describes how the records will be selected.

Simulated Purchases

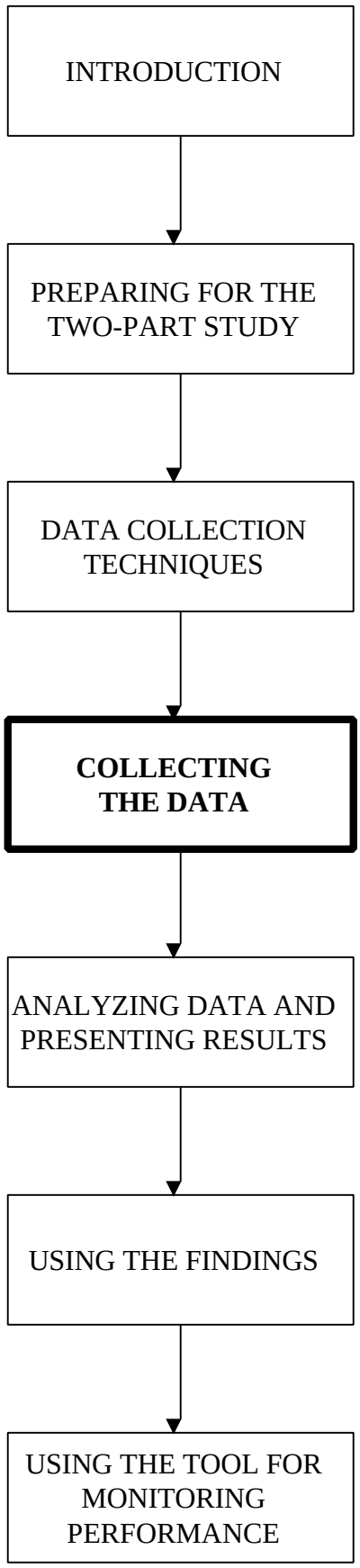
The simulated purchases technique is when data collectors pose as ordinary customers and attempt to purchase treatment for a certain condition. Simulated purchases are used rather than direct observation because observation requires the observer to stay at the site for a period of time. In a retail setting this may be disruptive to customer service and would probably cause the drug sellers to modify their behavior. Also, if asked directly, drug sellers are likely to inaccurately report their practices. Experience in a number of countries shows that there are usually significant differences between drug sellers' reported and observed prescribing practices. Using simulated purchases should minimize both the problems of bias in the study and the inconvenience to the drug seller or drug store manager.

Direct Observations

Direct observation is a data collection technique used in the Drug Use Study. Structured observations require the data collectors to directly observe the behavior of the health workers for the purpose of describing particular prescribing practices. The data collector will use a guide to record whether or not certain events have taken place. The process is described in greater detail in Chapter 4, Collecting the Data, in the "Define Methods for Drug Use Study" section.

Exit Poll Interviews

Exit poll interviews are used in the Drug Use Study. Caregivers of sick children are the target audience for the exit poll interviews. The purpose of the exit poll interviews is to determine how well each caregiver understood the instructions given by the health worker or drug dispenser about the medicine prescribed, about follow-up care in case of worsening conditions, and whether (s)he has obtained the required medication. This is explained in more detail in the *Data Collector's Guide*.


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 4.

COLLECTING THE DATA

Define Methods for Drug Availability Study

The purpose of conducting the Drug Availability Study is to determine the degree to which the drugs, vaccines, and supplies needed for treating and preventing common childhood illnesses are available. This will require collecting information and data that will allow the investigator to calculate or derive the indicators listed in Chapter 1 and to answer the following questions:

1. Are the drugs and medical supplies required to treat children two months to five years old available in public health facilities?

2. What are the determinants of product availability in the public sector and what can be done to bring about improvement?

By conducting an accurate and systematic assessment of the logistics supply system for drugs and supplies used for IMCI, the investigator will identify specific strengths and weaknesses of the system and, in the process, gather information that will be useful in planning corrective interventions for weaknesses identified in the system.

Before data collection begins, it is critical to the success of the Drug Availability Study that investigators and other study team members complete the planning steps outlined in Chapter 2. To summarize, investigators should have planned a schedule for collecting the following information:

? Vital statistics and background information such as exchange rates, national and regional population figures, incidence of major health problems, etc.

? Overview of MOH pharmaceutical management operations such as schematic of flow of drugs, transport, delivery schedules, numbers and locations of MOH health facilities, budgets at central and regional levels, numbers and locations of drug wholesalers, distributors, and manufacturers, drug cost recovery systems, etc.

Once this information has been collected, it should be distributed to the investigators prior to the start of data collection.

An important point to understand and remember while conducting the Drug Availability Study is that IMCI is not a distinct program in and of itself. IMCI is a strategy that seeks to integrate the management of different childhood illnesses. The management of some of these diseases, for example, measles, may be supplied through the vertically managed Expanded Programme on Immunizations (EPI) and, thus, have a separate logistics system of drug supply. At the same time, another IMCI health problem, for example, diarrhea, may be dependent on the MOH's routine distribution system for its source of drugs. Therefore, it is important to collect all the information that is needed to provide a "complete" picture of the logistics system for all DMCI tracer drugs.

Sites for data collection are specified for each of the seven drug availability indicators. In general, the data collection sites for the DMCI indicators include MOH central offices, central and regional medical stores, and health facilities. Among these sites, four different data collection techniques will be used to gather information for deriving or calculating the DMCI availability indicators. These techniques include document review, structured interviews, and physical inventory checks. Table 9 summarizes the data collection sites, techniques, and forms for the Drug Availability Study.

Table 9. Data Collection Sites and Techniques for the Drug Availability Study

Data Collection Sites	Data Collection Techniques	Data Collection Forms
Ministry of Health Central Offices	Structured Interviews and Document Review	DAS-5
Ministry of Health / Central Medical Stores	Physical Inventory Check and Records Review	DAS-2, DAS-3, DAS-4
Regional Medical Stores	Physical Inventory Check and Records Review	DAS-2, DAS-3, DAS-4
Health Facilities	Physical Inventory Check and Records Review	DAS-2, DAS-3, DAS-4

Select the Study Time Period

Several of the availability indicators are based on a retrospective review of stock records. For the drug management assessment, investigators should select a study time period to cover the last consecutive 12 months or an equivalent period of time. It is important for all data collectors to use the same 12-month time period to ensure that the data received from all sites are comparable. Therefore, the time period should be decided prior to the start of the data collection process, and every data collector should know the agreed-upon time period.

Define Methods for Drug Use Study

Define Methods

As mentioned earlier, the purpose of the Drug Use Study is to assess the clinical and cost implications of prescribing practices for selected childhood illnesses. For these conditions, study investigators will gather data from records available in health facilities to calculate or derive results for the DMCI indicators.

1. What are current prescribing practices for important childhood illnesses?

2. Are the current prescribing practices clinically appropriate?

3. How does the drug cost of current practices for treating IMCI health problems compare with what the cost would be if IMCI treatment guidelines are followed?

4. Are drugs required to treat children from two months to five years old available and affordable in the private sector?

Sample Size

An important step in planning for the Drug Use Study is determining the appropriate sample size. For the Drug Use Study in health facilities, two of the four sampling design steps discussed in Chapter 2, that is, selection of the health facility sample and selection of the patient encounter sample, will apply to this portion of the assessment.

The sample size used in this manual for health facilities is 20, 5 from each of the four selected geographic regions of the country. Note that, especially in large facilities (e.g., hospitals), patients may be admitted and therefore unavailable for exit poll questions. In order to avoid this problem and keep sample size statistically sound, it may be necessary to increase the sample size. Chapter 2 details the steps for actually making the site selections. Patient encounter sampling is addressed in the following sections on Retrospective and Prospective Data Collection.

Data Collection in Health Facilities

In general, there are two options for collecting drug use data: prospectively through observation and retrospectively through records. Prospective data collection through observational methods for morbidity-specific analysis is expensive and time-consuming because it is necessary to remain at one site until a sufficient number of cases for the target health problem has been observed. However, prospective methodologies can provide useful information about the diagnostic process and on the communication between health providers and patients. The retrospective method, through a review of facility registers, patient records, or dispensing records, is less time-consuming, less expensive, and can describe practices over a longer period of time. However, the information provided in records is often incomplete. The *DMCI Manual* uses both forms of data collection.

Retrospective Data Collection in Health Facilities

To gather information for Drug Use Study indicators 8-17, data collection will involve a retrospective review of patient records in MOH health facilities. The retrospective method of data collection requires that adequate sources of data exist. For the purposes of this study, the records should allow selection of a random sample of patient encounters within a defined period of time. The records should also include the specific names, strengths, and routes of administration of all drugs prescribed.

For each IMCI health problem studied through retrospective data collection, a minimum of 600 patient encounter records must be reviewed. This is achieved by randomly selecting 30 medical records for each IMCI problem in each of the 20 health facilities. Examples of patient encounter records include daily registers, medical records, or prescription slips.

N REMEMBER

The IMCI health problem of ARI is separated into pneumonia and no-pneumonia (cough or cold). Therefore, a total of 1,200 patient encounter records (30 randomly selected records from each facility for pneumonia and 30 for no-pneumonia [cough or cold]) are needed.

For an encounter with multiple health problems, each condition is entered on the data collection form, but only one is entered in the software for analysis. How to select the condition for entry into the software is discussed in Annex 6, in the section on Preparing the Data.

Organizers should also discuss as a group, and reach consensus on, a list of local terms used to describe symptoms that may be listed in health facility records to denote the study health problems. This list can be used as a reference by data collectors.

Based on experience in a number of countries, the following steps are suggested:

Step One: Begin by extracting, from the facility's patient register, a list of names of at least three patients per month for the IMCI problem under study, for the most recent 12 months prior to the time of the study. Start with the most recent full month and work backwards (e.g., October 1998, September 1998, August 1998, etc.).

Step Two: In rare cases, most or all of the data required may be found in the register. More commonly, however, it is necessary to consult the individual patient records and/or dispensary records. Make sure to check the quality of the records (in terms of completeness) first before selecting the record as an encounter to include in the data sample.

Step Three: In either case, the next step is to select from the list of names records that contain information (that is as complete as possible) for at least two patients per month during the low season and four patient records per month during the high season for the given health problem. For instance, in Paraguay, where the high season diarrhea months are from November to March, the data collectors will randomly choose four records (as described above), while for the months from April to October, the data collectors will randomly choose two records. If there is no seasonality involved in the occurrence of the IMCI problem, the data collectors will randomly choose 3 records per month, i.e., a total of 36 records. As some records may be incomplete and thus will need to be discarded, it is recommended that 36 records be selected rather than the required 30.

Step Four: To use a random process for selecting names from the facility's patient register, follow the interval method of sampling described in Chapter 2. To summarize, for each month (using the list of local terms the study team has developed to identify the particular health problem), group the encounters according to diarrhea, pneumonia, no-pneumonia (cough or cold), malaria, etc. For each month:

- Total the number of encounters for each health problem separately.

- Select every n^{th} encounter, where n is determined by dividing the number of encounters identified for that month by 3. For example, if 25 diarrhea encounters were identified for the month of October, divide 25 by 3 to equal 8.3. Then, select every eighth encounter to randomly identify the three encounters needed for diarrhea in the month of October.

- Repeat this same process for each illness being reviewed for the month of October. Finally, carry out this same process for each of the remaining 11 months. (Note: Pneumonia encounters may be difficult to identify at lower level facilities, such as rural health posts, as opposed to hospitals. This may be because the medical records at lower level facilities are incomplete or the practice is to refer severe pneumonia cases to the local hospital.) For pneumonia, review four months

of records; if fewer than five cases in total have been identified, abandon the process for pneumonia and focus on diarrhea and no-pneumonia (cough or cold). The time required to review 12 months of records for a probable data set of fewer than 15 cases is not efficient use of the limited time available.

? Starting from the most recent case, the next step is to fill out the data collection forms, recording information until *complete data on all indicators* are collected for 30 outpatient contacts for each health problem studied at each site.

N REMEMBER

The reason for beginning with the larger list of names (36 rather than the required 30) is that very often the records do not contain complete data for every contact, so a certain number of names for which data are incomplete will have to be discarded.

Incomplete Retrospective Data in Health Facilities

Very often, data from records are incomplete. This is particularly true for prescribing data such as the dosage regimen and duration of therapy. It will be rare to find retrospective data that contain all the information needed. The following algorithm is an approach that can be used to collect "proxy" data to fill-in incomplete retrospective data. However, the obvious drawback to this approach is that with each progressive step the data collected are probably less and less close to the actual prescription pattern. The boxes contain the possible situations, and the text beneath indicates what course of action could be followed.

Retrospective data available in records over a period of 12 months, containing all necessary details.

Use retrospective method.

Records available over a period of 12 months, not containing all necessary details, prescriber can be interviewed.

Use retrospective method and interview the prescriber on what his or her normal prescribing practices are for each of the prescribed drugs for the encounter.

Records available over a period of 12 months, not containing all necessary details, prescriber cannot be interviewed, but head of the facility can be interviewed.

Use retrospective method and interview the head of the outpatient department on what the recommended prescribing practices are for each of the prescribed drugs for the encounter.

Prospective Data Collection in Health Facilities

To gather information for Drug Use Study indicators 18-20, a prospective method will be used. The prospective method for the Drug Use Study is modeled after the USAID/BASICS *Integrated Health Facility Assessment Manual*.[3] The Observation Checklist—Sick Child identifies children who will be observed on the basis of what the caregiver gives as a reason for bringing the child to the facility. These are identified as diarrhea/vomiting, fever/malaria, and difficulty breathing/cough/pneumonia. The study investigators should obtain a copy of the Observation Checklist—Sick Child survey questionnaire, to supplement information for the Drug Use Study data collection process.

The patient encounter sample size for observation-only indicators 18-20 is a special case. As discussed in the next section, a convenience sample of patients two months to five years old (those who happen to be available at the time of data collection) with any health problem within each health facility will serve as the sample. If the facility is busy enough that the data collector can observe 10 to 15 encounters of children with IMCI conditions, it is better to focus data collection efforts on them. Data collectors should observe 10 to 15 patient encounters in each of the 20 health facility sites.

Review of Data Collection Techniques for Prospective Method in Health Facilities

Structured observation will be the data collection technique used with the prospective method.[4] This technique applies to Drug Use Study indicators 18-20. Observation requires the data collector to directly observe the behavior of the health worker(s) with the purpose of describing particular prescribing practices. For this study, the data collector will conduct a nonparticipant observation because the data collector will observe the health worker without interacting with the person being observed. The technique is considered structured because the observer, in this case the data collector, will observe events using a guide that has been planned in advance (i.e., based on the specific prescribing practices described in the indicators). The observer/data collector, as inconspicuously as possible, will record whether or not the events take place during the session.

[3]John Murray and Serge Manoncourt. 1998. *Integrated Health Facility Assessment Manual: Using Local Planning to Improve the Quality of Child Care at Health Facilities.* Published for the U.S. Agency for International Development by the Basic Support for Institutionalizing Child Survival (BASICS) Project, Arlington, Va.

[4]International Network for Rational Use of Drugs (INRUD) Social Scientists Working Group. December 1996. *How to Use Qualitative Methods to Design Drug Use Interventions.* Working Draft. Arlington, Va.: Management Sciences for Health.

To work, this technique requires qualified and reliable data collectors to serve as observers, a clear and informative observational guide, and the cooperation of those being observed. One factor that limits the objectivity of the process is the presence of the "noninteracting" observer. This person's presence may influence the behaviors of the person or events being observed. Thus, there is a level of bias in the process on the part of both the observer (subjective judgment regarding events being recorded) and the health workers being observed (may alter their usual performance to impress the observer). Data collectors should be trained to be neutral and nonjudgmental toward the person being observed.

Prior to observing a consultation, the data collector must obtain permission to conduct these observations from the administration of the health facility and must develop a system of identifying the health problems of the patients. This can be done by asking each of the caregivers directly about the nature of the complaint or ailment of the child two months to five years old as they wait in the lobby. Another option would be for the data collector to develop a master patient list that identifies each patient's age and chief complaint from the patient register and to observe each of those consultations. Some methods may be applied more easily in larger facilities, while other methods may be more efficient in smaller facilities. Whatever the approach selected, it should first be discussed as a group among study team members and agreed upon prior to the start of the actual observations.

One of the challenges in using the prospective method in this setting is collecting data for a large enough sample size within the short time frame available for observation. As mentioned earlier, for this particular aspect of the study, a convenience sample of patients will serve as the data set. This may make it difficult to identify a large enough sample of cases. Therefore, the data collectors should include in the sample all patients two months to five years old within each health facility. Although random selection would eliminate potential biases, given the limited data collection time period, using age as the only selection criteria is necessary to have a large enough sample size.

Spending a half-day of observation in each health facility should provide a representative data set to review the prescribing practices of health workers for patients two months to five years of age. While no firm rule exists, data collectors should try to observe 10 to 15 patient encounters in each of the 20 health facility sites to adequately describe the prescribing practices.

Two data collectors should work as a team. One data collector should be located in the examination room or area to observe and hear the health worker's interactions with patients. The data collector must be as unobtrusive as possible and not disrupt the consultation or bias the responses of the caregiver or the behavior of the health worker. A new observation questionnaire should be completed for each infant or child seen. The other data collector should be stationed outside the facility to conduct exit poll interviews of patients as they leave.

To conduct the structured observations, follow these steps:

Step One: The study investigators, in collaboration with the data collectors, should develop the observation guide and exit poll interview guide. This should include a checklist of the specific prescribing practices to look for during the observation or to ask about during the exit poll interview. Forms DUS-2 and DUS-3 in the *Data Collector's Guide* can serve as models.

Step Two: Carefully select the data collectors who will serve as observers. To help ensure accurate data, observers should be familiar with the cultural background of the people being observed and be able to understand their language. They should also be familiar with pharmaceutical and general medical terms and be able to sit quietly and observe without interfering.

Step Three: Train observers/interviewers and conduct a practice session to test the data collector's observation technique, exit poll interview skills, as well as the observation guide and exit poll interview survey. A sample observation guide (DUS-2) and exit poll interview survey form (DUS-3) are included in the *Data Collector's Guide*.

Step Four: Determine the encounter to be observed by identifying patients either in the health facility waiting area or as they are registered according to the description of the chief complaint and the age of the patient. Once the patient has been identified, one of the observers should follow the patient (and caregiver) through the screening, examination, and treatment process until the patient leaves the health facility.

Step Five: Give the patient's caregiver a slip of paper (with the patient/encounter number on it) to carry until they exit the facility. This will enable the data collector conducting the exit poll interviews to identify which caregivers to interview. As the patient leaves the facility, the other data collection team member should ask the caregiver for the paper and record the same number on the exit poll interview survey form, and proceed to conduct the exit poll interview. This process will allow data collectors to match the observation with the exit poll interview and assist in the comparison of what was said (or not said) to the caregiver by the health worker and what was understood by the caregiver.

Step Six: Analyze and interpret the observational findings.

Sample Size of Drug Retail Outlets

Chapter 2 provides a detailed discussion of sampling. To summarize, the best approach, from the point of view of representative sampling, is random selection of drug retail outlets within each of the four geographic areas in the sample design. The best way to accomplish this is to apply the systematic interval sampling method to site lists, as described in Chapter 2. However, a simpler approach, from the logistical point of view, is to choose the site that is geographically closest to each randomly selected health facility visited. Sample 20 drug retail outlets and use the same 20

outlets for the diarrhea, ARI, and malaria simulated purchases scenarios, but employ different data collectors, one for each scenario.

Conduct Survey in Drug Retail Outlets

The first step in conducting the survey is to review the workplan with the rest of the study team. Make sure each data collector is familiar with the specific drug retail outlets to be surveyed and has a timetable of when the simulated purchases will occur. Each data collector should have enough money to make the purchases and should know the transportation and accommodation arrangements. As part of the review, also make sure each person is familiar with and has enough copies of all the Drug Use Study data collection forms (and instructions) he or she needs for each drug retail outlet to be surveyed.

Review of Data Collection Technique in Drug Retail Outlets

The data on the prescribing practices in drug retail outlets will be collected prospectively. The data collection technique used will be simulated purchases. The first step is to recruit the data collectors for simulated purchases. They should be local people whose appearance and demeanor suggest that they are regularly employed, for example, as vehicle drivers or secretaries. The gender of the data collector may affect results; therefore, make sure that all data collectors are of the same gender. Normally, women are the best choice.

The trained data collectors will have the task of presenting two to three scenarios, that is, one for diarrhea, one for ARI (no-pneumonia), and one for malaria. At each site, each scenario should be presented by different data collectors, preferably on different days. If for logistics reasons these purchases cannot be arranged on different days, they should take place at least a few hours apart. All data collectors should be trained to carry out all scenarios.

The simpler selection approach of choosing the site that is geographically closest to each randomly selected health facility visited should be used. The data collector will leave the study health facility, turn right and walk to the nearest drug retail outlet and simulate the purchase according to the standard scenario for diarrhea. Then, the data collector will return to the study health facility and, this time, turn left and walk to the nearest retail outlet, where he or she will simulate the purchase according to the standard scenario for no-pneumonia. Working in teams of two, the data collectors should decide in advance the specific scenario (diarrhea, malaria, or ARI) each will conduct for each specific drug retail outlet.

To use the simulated purchases data collection technique, train data collectors to follow the scenarios below when visiting drug retail outlets:

? The ARI (No-Pneumonia) Scenario

- The data collector will tell the salesperson that his or her two-year-old child has been suffering from a simple cold for the last two days.

- If asked about symptoms, the data collector will then say that the child has a low fever, is eating and drinking as usual, has a runny nose with clear discharge, and a mild cough. The data collector should also say that the child has not received any other treatment.
- The data collector requests to buy something to help the child get better.
- The data collector buys what the drug seller recommends and exits the store.
- Upon leaving the store, the data collector records the results of the encounter on form DUS-4A.

? The Diarrhea Scenario

- The data collector will present the case of a child with simple diarrhea for the past two days.
- The data collector is coached to say, if asked about symptoms, that there is no blood or mucus in the child's stool and that the child has about four to five loose, runny stools each day.
- The data collector requests to buy something to help the child get better.
- Upon hearing the response, the data collector buys the product or products and exits the store.
- Upon leaving the store, the data collector records the results of the encounter on form DUS-4B.

? The Malaria Scenario

- The data collector will tell the salesperson that his or her two-year-old child has had a fever for the last two days.
- If asked about symptoms, the data collector will then say that the child does not have a cough or any other symptoms. The data collector should also say that the child has not had any other treatment.
- The data collector requests to buy something to help the child get better.
- The data collector buys what the drug seller recommends and exits the store.
- Upon leaving the store, the data collector records the results of the encounter on form DUS-4C.

Collect Drug Price Data in Drug Retail Outlets

As part of the process of conducting reviews of medical records in health facilities (DUS-1 data collection form), a record of the drugs prescribed will be developed. To collect data on the retail prices for these drugs, a data collector will visit the drug retail outlets, ask the drug seller the price for each drug, and record the sales prices on DUS-1. If an item is not stocked, skip that drug and go on to the next one. Where a site stocks more than one brand of the same product, record the name and price of the least expensive product. For drugs that are repeated on DUS-1, only record the price the first time it appears on the form. The prices collected on this form will be used to calculate the costs for indicator 15, average cost of drugs prescribed as a percentage of costs if IMCI norms for treatment were followed.

Conduct Survey

As part of the planning process, a workplan should be completed that includes all the specific sites, facilities, departments, and personnel to be visited, a timetable of when the visits will occur, the assignment of teams to specific locations or areas, and the transport and accommodation arrangements. In preparation for conducting the survey of MOH offices, facilities, and drug retail outlets, it is important to review the workplan with the whole study team. Maintaining a high level of open communication among study team members and making sure that all team members know their respective responsibilities will help to minimize problems during the data collection process.

Before sending data collectors into the field, study investigators should make sure that each person is familiar with, and has enough copies of, all the data collection instruments he or she will need for the site(s) that person is responsible for. Explicit, written instructions for using the data collection instruments should be given to each data collector. Samples of written instructions are included with the respective samples of data collection instruments in the *Data Collector's Guide*.

Supplies, such as pens, notebooks, bags for carrying forms, etc., should also be given to each data collector. Study investigators should also make sure that all the site visits have been approved and scheduled by the MOH. Data collectors should be given copies of letters of introduction that confirm their identity and authorization to survey that site. Study investigators should develop a system for collecting, grouping, and storing completed data collection forms.

Troubleshooting

Drug Availability Study Troubleshooting

As mentioned earlier, the key to successful data collection is good planning. However, no matter how thorough the planning, problems can always arise. Such unexpected problems can be minimized if good, open communication among study team members is maintained, and all participants remain flexible and willing to adapt to new situations. Table 10 presents a few typical problems, along with suggested solutions, that can happen while conducting the Drug Availability Study. However, remember these examples are only illustrative. Every country is different and can present the investigator with different, country-specific problems.

Table 10. Illustrative Examples of Potential DAS Problems and Possible Solutions

Potential Problems	Possible Solutions
Key informants do not keep scheduled appointments.	Reconfirm meeting times, clinic hours, and retail outlet hours. Create backup options and, if possible, try to schedule meetings in the same geographic area on the same day.
Data collectors do not show up for training and work.	Recruit a few extra data collectors to anticipate any transportation or personal emergencies among data collectors. Planning for teams of three data collectors means that coverage is possible even though one team member may drop out.
IMCI tracer products are not available in the country.	As mentioned in Chapter 2, the study team should adapt the sample list of IMCI tracer products (Table 6) to the country setting. If a product on the list is not available, select the best alternative available in-country.
The dosage form of the drug is different than indicated on the sample data collection form.	The sample data collection forms should also be adapted and tested as outlined in Chapter 2. This should catch any inconsistencies before the data collection begins.
Health facility and drug retail managers are skeptical or resistant to permitting someone to go through confidential patient records.	Sometimes having an "official government letter of authorization" may not be enough to gain cooperation of managers. Try to gain support for the study from health professional groups such as associations for doctors or pharmacists. Also talk to the managers about the study and the ultimate benefit to the country.
A sample facility is closed or not functioning for some reason.	Have a defined "substitute" list of facilities in anticipation of any closings. Data collectors should not be left to make the decision on their own about selecting sites.
Data collectors are not completing the data forms correctly and some are not legible.	Make sure that the data collectors use pens, not pencils, to fill out the data collection forms. Conduct spot checks of the forms to catch any problems early in the process and make pay contingent upon receiving acceptable forms.

Drug Use Study Troubleshooting

The Drug Use Study requires the investigators to manage a number of different activities and, as such, there may be times when problems arise. Remind study team members to remain flexible; they must be ready and willing to adapt to new situations. Many of these problems may be unforeseen, but many of them can be minimized by good planning. Table 11 presents a few typical problems, along with suggested solutions, that can happen while conducting the Drug Use Study. These examples are only illustrative. Every country is different and can present the investigator with different, country-specific problems.

Table 11. Illustrative Examples of Potential DUS Problems and Possible Solutions

Potential Problems	Possible Solutions
Fewer than 30 medical records exist for each health problem studied (no-pneumonia, pneumonia, diarrhea, malaria).	Collect as many records as available and build in a process of either asking the team leader for advice or going to a predetermined backup facility. (See Chapter 4, section on Retrospective Data Collection in Health Facilities.)
The specific diagnosis is not reported on the medical records.	Before beginning the review of patient records, the study team should meet with health facility managers and health workers to define a list of local terms or symptoms that are equivalent to each health problem studied. This should be part of the process for testing the data instruments and methodology. The team should develop (and reach consensus on) a master list of possible symptoms that can be used to describe a particular diagnosis. The list can help identify patient encounters for diarrhea, pneumonia, no-pneumonia (cough or cold), and malaria.
There are not enough drug retail outlets close to the sampled health facility in rural areas.	Use proportional sampling, whereby a larger portion of the drug retail outlets sampled is concentrated in urban areas.
Health facility managers are skeptical or resistant to permitting someone to observe prescribing practices.	Sometimes having an “official government letter of authorization” may not be enough to gain cooperation of managers. Try to gain support for the study from health professional groups such as associations for doctors or pharmacists. Also, talk to the managers about the study and the ultimate benefit to the country. Assure the manager that the names of neither staff nor patients will be used on the data collection forms and that all the information collected will be shared with the manager.

Potential Problems	Possible Solutions
Local drug retail outlet community has identified a data collector as a simulated purchaser.	Data collectors should do the simulated purchases as quickly as possible once they arrive in a particular geographic area. However, if word still gets out that there are surveyors in town, change the time (or other logistics pattern) they make the purchase or switch the list of outlets they are responsible for with their team member.
Data collectors do not have enough money to make the simulated purchases.	As part of testing the data collection instruments and the simulated purchases scenarios, estimate the cost of local products in drug retail outlets and factor this into the local expenses that will be needed by data collectors. Build in a process of reimbursing data collectors for any purchases that exceed the estimate. Make sure that reimbursement is contingent upon returning with the products and the receipt.
Drugs prescribed are recorded by brand names that are unfamiliar to the data collectors.	All information should be recorded on the data collection forms exactly as written in the patient encounter record, even if unfamiliar to the data collector. Data collectors should be instructed to avoid any interpretation.
Drugs prescribed are identified, but numbers of units are not.	All of the data needed for a particular patient encounter may not be in the same source of records. Start with the patient register, then move to the medical records. If data are still missing on the drugs prescribed, check to see if the facility has pharmacy or dispensing records. If data are not available from records, interview the prescriber. If the prescriber is not available, interview the medical head of the facility.
Data collectors are not completing the data forms correctly and some are not legible.	Make sure that the data collectors use pen, not pencil, to fill out the data collection forms. Conduct spot checks of the forms to catch any problems early in the process and make pay contingent upon receiving acceptable forms.

Data Recording

It is important to instruct data collectors to write legibly with a pen (not pencil) and to use marks or phrases that indicate a complete thought or response when filling out the data collection instruments. Depending on the data collection instrument, this may mean using a check mark, writing "*YES*" or "*NO*," circling a response, or writing a phrase or sentence to explain a

particular finding. This is important because the person completing the form may not be the same person who will enter the data or tabulate the results.

Someone, usually the data collection team manager, on the study team should be designated to review each data collection instrument when it is completed, to check the data for completeness and correctness. This process is useful because it will allow identification of any problems early in the data collection phase, and corrective interventions can be implemented to avoid future mistakes.

Completing the Data Collection Instruments

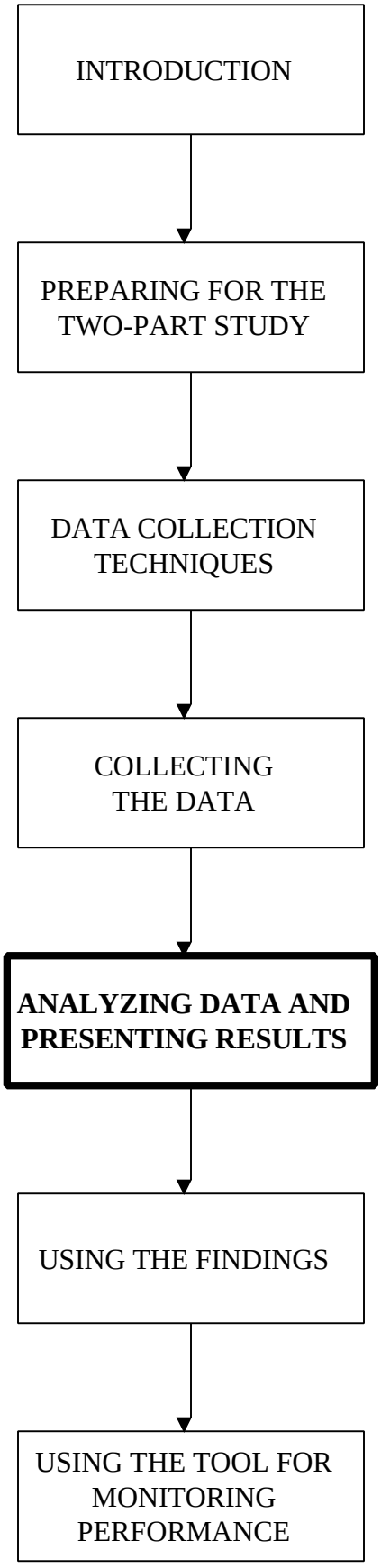
At the end of each site visit, every data collection questionnaire, checklist, or form completed during the visit should be examined for incomplete data. The responsible data collector should make every attempt to collect the incomplete data before leaving the site.

To avoid confusion, it is advisable to collate and prepare data for analysis as it is collected. Before beginning the process to derive the specific indicators, a complete re-check and editing is necessary to clean the data. If data for a particular item on the data collection form are missing or incomplete, that item (not the entire data collection form) should be eliminated. The number of eliminated items should be counted and discussed in the final report.

Table 12 gives a checklist for the data collection team manager. The section on Preparing the Data in Annex 6 details steps for the study organizer to take before beginning data entry.

Table 12. Checklist for Data Collection Team Manager

Responsibility	**Completed? (T)**
Ensure that all data collection forms are complete and legible	
Complete the shaded rows and columns on forms DAS-2, DAS-3, DUS-2, DUS-3, and DUS-4	
Prepare a summary for the survey organizer of any problems encountered or substitutions made, e.g., different facilities used	


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 5.

ANALYZING DATA AND PRESENTING RESULTS

Now that the data have been collected, the next step is the analysis. Analyzing the data will help to identify strengths and weaknesses in the drug management process and highlight areas that need specific action to improve IMCI drug management capabilities. Analysis should proceed in a systematic fashion by (1) calculating the indicators and summarizing the information, (2) interpreting the results, (3) disseminating the findings, and (4) preparing a written report.

Calculating the Indicators and Summarizing the Information

Once the data from the data collection instruments are entered into Epi Info, or some other computerized system for collating survey results, derive the indicators. For those who wish to use a manual process, calculate the result for the specific indicator from the appropriate data collection instrument. Annex 2 of this manual provides specific instructions on how to calculate each indicator, with an example. Annex 6 provides information on how to use the Epi Info data entry program, designed for use with the *DMCI Manual*, to collate survey results. Annex 7 provides a detailed data dictionary for the Epi Info-based DMCI software, to be used as a reference for programmers.

Some thought should be given to how the data should be grouped or summarized. It is important to distill the large volume of data into a few key findings that capture the study results. Summarize the data by indicator, noting subgroupings that may be useful to the analysis, such as geographic region, type of health facility, and/or target audience. Once the data are summarized, they will be easier to review and analyze.

Interpreting the Results

At the end of the field work and prior to the implementation of a particular intervention, it is important to spend time as a team to interpret the findings. No matter how well the assessment was designed and planned, the data obtained may not be totally reliable, for any number of reasons. Part of the job of the study team when analyzing data is to determine what biases, inaccuracies, or inconsistencies may exist, and what precautions are necessary in interpreting the results.

Researchers and study team members should all play an active role in examining data and considering what type of additional analyses may be appropriate. One strategy is to hold a synthesis meeting of everyone involved in the investigation. If not everyone at the meeting is familiar with all aspects of the data collection, the first activity should be to present separate reports on each study. The reports should be brief and cover the specific study questions addressed, methods used, results, and conclusions. Written summaries of findings, along with tables and graphs should be distributed. Through the analysis, specific drug management problems will become more apparent, as will the group of prescribers or patients most likely to gain the most from an intervention. Based on this understanding of the problems to be addressed, the synthesis group should then direct its attention to designing an intervention.

Tables 13 and 14 present the DMCI indicators for the Drug Availability and Use Studies, their interpretation, and the potential actions that can be taken as next steps. It is important to understand that none of the DMCI indicators should be viewed in isolation or taken at face value. It is the complete set of indicators that helps to give a meaningful picture of the drug management situation. The results become even more indicative when they can be compared to a baseline over time.

Table 13. Interpretation of Indicators for Drug Availability Study

Indicator Name	Desired Change Over Time	Interpretation	Potential Actions
1. Percentage of DMCI tracer drug products on the national drug formulary (NDF)/Essential Drugs List (EDL)	INCREASE	Theoretically, all, or 100%, of the drugs needed for IMCI should be on the NDF or EDL. It may be that all of the different dosage strengths and/or dosage forms for a particular drug are not on the list. In that case, it is important to ask, "Can the child be treated appropriately without having available a particular dosage form or strength of the drug?"	If the answer is "no" to the question under the Interpretation section, then greater coordination is needed between MOH/IMCI and MOH/EDL programs to produce a more coherent list. This can be achieved by recommending a policy change to include the missing drugs in the NDF or EDL or by changing the IMCI guidelines to reflect the drugs available on the NDF or EDL.
2. Percentage of median international price paid for a set of DMCI tracer drugs that was part of the last regular MOH procurement	DECREASE	The result for each tracer drug should be reviewed. The higher the percentage, the greater the potential cost savings. The goal should be for the MOH to achieve at least or better than a 1:1 ratio when the MOH procurement price is compared with the international price.	Examine all factors that contribute to the MOH procurement price before deciding on possible interventions. Possible areas to review include the terms of tender, amounts ordered and potential economies of scale, and supplier prices for each drug. For health facilities in decentralized settings, compare prices through local private sector procurement vs. prices through regional or national warehouses. If revolving drug funds are used, compare the sales price of MOH health facilities with the sales price in drug retail outlets.

Indicator Name	Desired Change Over Time	Interpretation	Potential Actions
3. Average percentage of a set of unexpired DMCI tracer drugs available in MOH storage and health facilities	INCREASE	Theoretically, all, or 100%, of the drugs should be available, all of the time. However, this indicator only provides a snapshot of the availability of drugs for IMCI at the time of the study.	To determine why availability is low requires further analysis. For example, problems could be in the area of budgeting, theft, wastage, quantification, and/or inventory management. Once the specific causes have been identified, potential interventions can be developed.
4. Average percentage of time out of stock for a set of DMCI tracer drugs in MOH storage and health facilities	DECREASE	The target for this indicator should be 0%, or no stock-outs. The result of the data collection will help to understand if availability is constant over time.	For high percentages of stock-outs, investigate to determine where the breakdown is in the system. Check for seasonal variations, changes in stock levels that correlate with procurement activities, etc.
5. Average percentage of stock records that corresponds with physical counts for a set of DMCI tracer drugs in MOH storage and health facilities	INCREASE	This measures the quality of the stock record keeping system. Caution: Some facilities update records periodically rather than on an ongoing basis. Study investigators should consider this when reviewing the accuracy of the record keeping system.	A low percentage of correspondence may suggest a need to review the record keeping system. Training may be needed in math skills, stock record keeping, and/or inventory procedures.

Indicator Name	Desired Change Over Time	Interpretation	Potential Actions
6. Percentage of MOH storage and health facilities visited that have a working refrigerator with freezing compartment and thermometer for vaccine storage	INCREASE	Theoretically, all, or 100%, of facilities should have a working refrigerator. Low percentages highlight possible problems in maintaining quality stock.	Identify resources to repair or replace nonworking units.
7. Percentage of MOH storage and health facilities with up-to-date refrigerator temperature monitoring records	INCREASE	Indicates whether personnel are adhering to recommended procedures.	For low percentages, investigate possible need for training to reinforce regular monitoring. Make sure that (1) someone is assigned the task, (2) the person assigned knows what to do, (3) forms are available to record the temperature, and (4) the person is supervised.

Table 14. Interpretation of Indicators for Drug Use Study

Indicator Name	Desired Change Over Time	Interpretation	Potential Actions
8. Percentage of MOH health facilities visited with an official manual of treatment guidelines for childhood illnesses, based on WHO IMCI treatment guidelines	INCREASE	Theoretically, all, or 100%, of facilities should have an official copy of treatment guidelines. Although the presence of guidelines does not mean that staff use them, and they do not ensure rational prescribing, treatment guidelines do provide a reference source that supports more appropriate prescribing.	Identify resources to provide at least one copy of treatment guidelines per facility. Distribution of the guidelines should be accompanied by training in the use of the guidelines.
9. Percentage of encounters diagnosed as no-pneumonia (cough or cold) that are prescribed antibiotics	DECREASE	This measures nonadherence to IMCI treatment guidelines. High percentages highlight a problem behavior and possible need for training.	For high percentages, investigate to determine why the behavior exists and which factors contribute to the behavior. Then, design appropriate interventions to correct the behavior.
10. Percentage of encounters diagnosed as pneumonia that are prescribed appropriate antibiotics, according to treatment guidelines	INCREASE	This measures adherence to IMCI treatment guidelines. High percentages identify a positive behavior that should be reinforced or encouraged. Low percentages identify the need for improvement.	For low percentages, investigate to determine why the behavior exists and which factors contribute to the behavior. Then, design appropriate interventions to correct the behavior.
11. Percentage of encounters diagnosed as diarrhea that are prescribed ORS	INCREASE	This measures adherence to IMCI guidelines. High percentages identify a positive behavior that should be reinforced or encouraged. Low percentages identify the need for improvement.	For low percentages, investigate to determine why the behavior exists and which factors contribute to the behavior. Then, design appropriate interventions to correct the behavior.

Indicator Name	Desired Change Over Time	Interpretation	Potential Actions
12. Percentage of encounters diagnosed as diarrhea that are prescribed antidiarrheals	DECREASE	This measures nonadherence to IMCI guidelines. High percentages highlight negative prescribing practices.	Investigate to determine why the behavior exists and which factors contribute to the behavior. Then, design appropriate interventions to correct the behavior.
13. Percentage of encounters diagnosed as non-dysentery/non-cholera diarrhea that are prescribed antibiotics	DECREASE	This measures nonadherence to IMCI guidelines. High percentages indicate inappropriate prescribing practices and suggest a need for further training in the rational use of antibiotics.	Investigate to determine why the behavior exists and which factors contribute to the behavior. Then, design appropriate education or training interventions.
14. Percentage of encounters diagnosed as malaria that are prescribed an appropriate oral antimalarial, according to treatment guidelines	INCREASE	This measures adherence to IMCI guidelines and measures a positive behavior that should be reinforced or encouraged. Low percentages identify the need for improvement.	For low percentages, investigate to determine why the behavior exists and which factors contribute to the behavior. Then, design appropriate interventions to correct the behavior.
15. Average cost of drugs prescribed as a percentage of costs if IMCI norms for treatment were followed	INCREASE OR DECREASE	If IMCI is followed, costs should be as expected. Any deviation suggests possible prescribing practices different from recommended treatment norms. Cost differences may indicate inappropriate prescribing. Cost differences should be investigated for prescribing practices not in line with IMCI guidelines.	For large differences, investigate to determine what the differences are and why. Once the specific practice is identified, interventions can be designed to address the problem.
16. Percentage of prescribed drugs actually dispensed	INCREASE	Theoretically, all, or 100%, of drugs prescribed should be dispensed. Low percentages identify problems of availability or poor dispensing practices.	Investigate to determine specific reasons why prescriptions presented for dispensing are not filled with the prescribed drug. The most common reasons are the drugs are not affordable to the caregiver and the drugs are not available.

Indicator Name	Desired Change Over Time	Interpretation	Potential Actions
17. Percentage of caregivers who could correctly describe how to give the prescribed medication	INCREASE	Low percentage indicates that health workers or drug dispensers are not providing enough information to patients about the medication, which can lead to nonadherence and treatment failure.	Identify the specific communication problems and investigate the usefulness of alternative communication strategies such as the use of local language, pictograms, demonstrations, etc.
18. Percentage of encounters where health workers asked one or more clinical questions from IMCI guidelines to determine severity of health problem	INCREASE	Theoretically, all, or 100%, of health workers should determine the severity of illness. A low percentage indicates that the health worker is not following the recommended IMCI guidelines.	Investigate the problem to determine why practitioners are not following the guidelines. IMCI training may need to be reinforced to improve health worker assessment skills.
19. Percentage of health workers who provided basic information to caregivers on how to give the recommended drug(s)	INCREASE	This indicator, together with 17, can help pinpoint communication problems between the health worker and the caregivers. A low percentage indicates that health workers are not providing enough information to caregivers about the medication, which could be a reason for nonadherence to treatment.	Investigate the problem to determine why practitioners are not following the guidelines. IMCI training may need to be reinforced to improve communication between the health worker and the caregiver.
20. Percentage of health workers who told caregivers about any signs of progressive illness and recommended a doctor or clinic visit if the signs appeared	INCREASE	A low percentage indicates that the health worker is not following the recommended IMCI guidelines.	Investigate the problem to determine why practitioners are not following the guidelines. IMCI training may need to be reinforced to improve the follow-up care and ensure that proper caregiver education is provided.

Disseminating the Findings

Until now, only the few people involved in the data collection process have been aware of the study findings. Now, IMCI health facility managers, MOH representatives, and others need to have an opportunity to be informed. There should be a formal presentation, encouraging in-depth discussions about the meaning of the results, specific drug management concerns, and potential interventions.

Those deciding how to present the findings should take into consideration both the intended audience and what specific results the audience should understand by looking at the findings. When presenting the findings, give equal attention to both strengths and weaknesses. The goal of the presentation is to determine a course of action for building on the strengths and increasing capabilities in the weaker drug management areas.

When developing presentations for policy makers, it is advisable to present a very clear executive summary and, to the extent possible, present key findings, recommendations, and projections of impact. Usually, this is best achieved graphically and in text or table form. Visual presentations of data in the form of tables, graphs, pie charts, etc. work best, supported by the written report to explain details. Annex 4 includes a sample table for presenting the indicator data.

The presentation should provide an overview of the goals and objectives of the drug management study, the process undertaken, and the major indicators measured. This will help people to understand how the conclusions were reached. Emphasize how current drug management practices affect the ability of the IMCI strategy to achieve goals and to improve staff performance and the quality of services. The session can lead to increased support for improvement in prioritized areas, reinforcing the audience's understanding of the need for and interest in improving drug management for IMCI.

Preparing a Written Report

A written report should be prepared to document the data collection experience and the findings. The report should include indicator tables. The DMCI software can assist in calculation of the indicators. However, other information that may not be entered into the software should also be included in the report, such as a list of the drugs most often prescribed, observations made during data review, survey background, and the different methodologies used to collect the data. In general, the report should include the following sections:

Executive Summary - Present key findings, recommendations, and projections of impact.

Introduction - Summarize the study objectives, the scope of the study, and the outline of the way the report is presented.

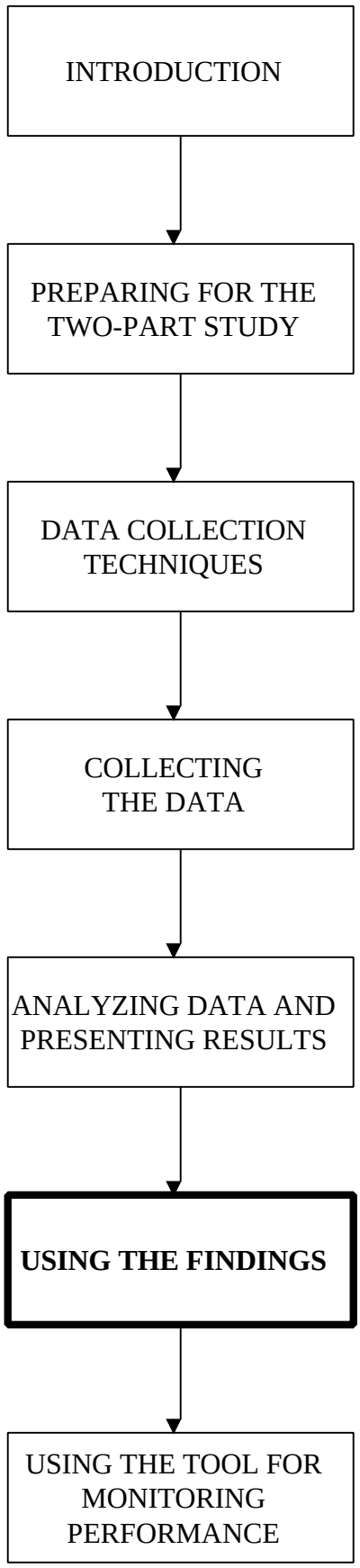
Methods - Summarize the indicator-based approach, the data collection techniques, instruments, sites, the sampling process, personnel, field work organization and supervision, and mode of data analysis.

Findings - Tabulate and describe the study results that include identification of the strengths and weaknesses of the drug management system. Also, discuss any assumptions, biases, inaccuracies, or inconsistencies that may exist and what precautions are necessary in interpreting the data.

Discussion - Address the problems encountered in conducting the study and possible underlying reasons and explanations for the main findings.

Conclusion - Present inferences, recommendations for corrective actions, and likely follow-up interventions.

A copy of the written report should be presented to the MOH IMCI health system manager. The report, along with the recommendations for follow-up interventions, will provide the necessary documentation that can help to support the need for system improvements.


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 6.

USING THE FINDINGS

Responding to the DMCI indicator results and other assessment findings requires a well thought out approach for selecting and implementing the most appropriate interventions to address IMCI drug management problems. Before attempting to improve drug availability or change drug use, the scale of the problem should be assessed and quantified (see Chapter 5). The underlying reasons for the problem then need to be investigated. Intervening before understanding the reasons for a drug shortage or a problem with prescribing practices can lead to unintended and negative consequences.

Developing an intervention strategy involves six major steps. These include:

1. Identify the problem and recognize the need for action
2. Identify underlying causes and motivating factors
3. List possible interventions
4. Assess resources available for action
5. Choose an intervention to test
6. Monitor the impact and restructure the intervention

The DMCI indicators have been developed to measure key aspects of the drug management system, in both the public and private sectors, and they should be viewed as the first step of an investigation. Conducting the DMCI studies should also reveal specific problems that may be addressed, but the studies may not provide enough information on the underlying causes and motivating factors that contribute to the problems. Therefore, each problem identified should be examined individually to ensure an in-depth understanding of the cause. Probing for a more in-depth understanding of a particular problem may require supplementing the findings with structured interviews or small focus groups. The information from the follow-up studies can be used to design interventions.

For example, some problems may be due to the national or regional drug management system and not specifically related to IMCI. This is especially true for the availability portion of the assessment. In such cases, the data developed through the assessment will be significant in documenting the negative effects of such policies or procedures on the management of childhood illness. On the other hand, it may be that one intervention approach could solve more than one problem. But in order to monitor for specific improvements, as discussed later, it is important to have a clear perspective of what the intervention is intended to do, problem-by-problem.

Following is a brief listing of some of the more common problems encountered in drug management. Each problem statement is followed by a summary of key points that should be considered when developing an appropriate response. This list is not exhaustive and is only meant to be illustrative. On the contrary, many problems may be unique to a specific country or region and thus require a unique solution. Selecting and implementing interventions requires time, teamwork, and commitment. The time spent in the planning and coordination phase will help ensure a successful outcome.

Drug Availability

Procurement

An effective procurement process ensures the availability of the right drugs in the right quantities, at reasonable prices, and at recognized standards of quality. Effective procurement is a collaborative process between the procurement office and technical and policy officials.

***Problem*:** Too many drugs on the procurement list

Key Points: Virtually no health program can afford to purchase all drugs on the market. A limited drug list or formulary, defining which drugs for IMCI will be purchased, is one of the most effective ways to control procurement costs. It simplifies other supply management activities and reduces inventory holding costs as well.

Possible Response: The first step is to order all drugs for IMCI by generic name and the second is to avoid generic duplication by only ordering one brand or label of each generic product. Another option for reducing the procurement list is to limit the purchase of therapeutically similar drugs by restricting the essential drug list or drug formulary to one of these drugs and combining the estimated purchase volume into a single, much larger quantity of the drug selected to take advantage of economies of scale.

The health system needs to be prepared to counter resistance from some doctors, who prefer a wide range of choices, and from drug suppliers, whose products may be removed from the list. Resistance can often be overcome by documenting the cost savings possible (through the use of indicators) with the restricted procurement list and pointing out the benefits of year-round access to the limited list rather than sporadic access to a larger list of drugs.

***Problem*:** Too much stock of some drugs and not enough of others

Key Points: Accurate estimates of drug requirements are needed to avoid stock-outs of some drugs and overstocks of others. One way to quantify pharmaceutical needs is to start with accurate past consumption data from all units being supplied. Unfortunately, in many countries, consumption data are incomplete or do not reflect real need because the supply pipeline has never been full.

Another method to estimate drug requirements is to base the estimate on morbidity data (e.g., the frequency of illness). The morbidity method estimates the need for specific items based on the expected number of attendances, the incidence of common diseases, and standard treatment guidelines for the diseases considered. This method requires data on the service population, accurate attendance data, and use of the IMCI standard treatment guidelines for the target conditions.

The issue of multiple drug sources complicates the problem of stock management even more. For example, in many countries, some drugs are procured centrally by the MOH, others are donated by international organizations, and still others are procured from the regional or district level independent from the central MOH.

Possible Response: Expert technical assistance in how to quantify drug needs for IMCI may be useful in the initial phases of the procurement program, with local officials participating to gain an understanding of the methodology. Also, arranging meetings with the major donor organizations to discuss donor coordination for drug procurement can improve the management of drug supply.

***Problem*:** Financing mechanisms causing problems with procurement cycle

Key Points: Inventory management improves when drugs can be ordered when needed rather than at an arbitrary point in the government fiscal year. When suppliers know that orders will be placed promptly after tendering and that payment will be made upon delivery, prices will be much more competitive.

Possible Response: Decoupling the drug procurement cycle from the government budget cycle has substantial management advantages. Strategies such as decentralized financial management and revolving drug funds are increasingly being employed to separate drug procurement from the annual MOH budget cycle. This separation also usually requires some form of cost recovery, such as revolving drug funds.

Alternative systems for supplying drugs to the public health systems include the central stores system, autonomous supply agency system, direct delivery system, prime vendor system, and private pharmacy system. Whichever system is used, checks and balances must be put in place for all major procurements and involve the procurement officer, health practitioners, and other user representatives.

Inventory Management

***Problem*:** Poor stock records

Key Points: Accurate and current stock records are essential to good inventory management. Stock records are a key source of information used to calculate needs. Thus, inaccurate records will produce inaccurate needs estimations (and problems with stock-outs, leaks, and expiry).

Possible Response: Each inventory system should monitor performance with indicators and produce regular reports on inventory and order status, operating costs, and consumption patterns. Staff training may be necessary as part of the plan to improve inventory management, such as the WHO/BASICS Drug Supply Management Training Workshop for First Level Facilities or the International Dispensary Association (IDA)/Management Sciences for Health (MSH) Managing Drug Supply for Primary Health Care Course for middle to higher level facilities.

***Problem*:** Inadequate quantities of drugs in storage

Key Points: The primary reason for holding stock in a drug supply system is to ensure availability of essential items at all times.

Possible Response: The selection of IMCI items to stock should be based on their value to the treatment of childhood illnesses and on the regularity and volume of consumption. VEN (vital, essential, nonessential) and ABC analyses are useful tools for defining which IMCI products on the essential drug or formulary list must be held in stock. Most of the drugs for IMCI should be promoted as vital (V) and, therefore, should always be available. Whichever formulas are used, it is necessary to adjust purchase quantities to take into account factors such as seasonal demand, disease patterns, expected changes in utilization or prices, currency fluctuations, and availability of storage space. One possible source for information on how to use ABC and VEN analysis is MSH's book, *Managing Drug Supply*.

Distribution

***Problem*:** Unreliable drug distribution system

Key Points: Drug distribution systems in some developing countries are constantly challenged by such problems as the lack of money for fuel, bad roads, union strikes, etc. A well-run distribution system should maintain a constant supply of drugs, keep drugs in good condition, minimize drug losses due to spoilage and expiry, minimize drug shortage points, use available transport as effectively as possible, reduce theft and fraud, and provide information for forecasting drug needs.

Possible Response: There should be a program of performance monitoring to ensure that the distribution system works as intended. Senior managers should regularly monitor the cost and performance of the distribution system as important indicators of the health system's operations. In some countries, private or parastatal distribution companies can provide cost-effective

alternatives for the storage and distribution of drugs, especially at the national and regional levels. Major alterations in the system should be introduced only after careful evaluation and planning, taking into account available human, financial, and material resources.

Drug Use

***Problem*:** Overuse of antibiotics for no-pneumonia (cough or cold) and diarrhea

Key Points: There are many documented cases of prescribing antibiotics for the common cold and for non-dysentery/non-cholera diarrhea. Such overprescribing can significantly increase the cost of drug therapy. Another consequence of the overuse of antibiotics is the development of resistance. Antibiotic resistance to common infections has rendered some formerly useful drugs ineffective. In the private sector, factors such as financial motivations, the lack of health-related knowledge among drug sellers, and consumer demand reinforce and promote the overuse of antibiotics.

Possible Response: Training is the most common intervention implemented in response to inappropriate prescribing practices. Training can be conducted in many different ways with a broad range of objectives. In general, training interventions targeting health providers are most successful when the training:

- ? Is problem-oriented and focuses on a single health problem or practice at a time;
- ? Incorporates multiple training approaches (e.g., lectures, group problem solving, role playing, opportunity to practice skills);
- ? Provides training at the work site;
- ? Uses opinion leaders or district level staff as trainers;
- ? Involves practical skills orientation; and
- ? Provides multiple sessions over time.

In addition, training interventions can be reinforced through the use of incentives and messages intensified through concurrent community and health worker education, supervision, and drug supply management. For example, Gonzalez Ochoa et al. (1996) found that reductions in community antibiotic use were twice as large when multimethod training and supervision for local physicians on ARI management was combined with intensive community education.[5] In Nicaragua, Hugh and Corrales (1995) demonstrated that it was possible to train local medical leaders to facilitate a group-oriented process to improve quality of ARI treatment within their own municipalities that resulted in reductions in antibiotic prescribing of 17.4%.[6]

[5]E. Gonzalez Ochoa, L. Armas Perez, J.R. Bravo Gonzalez, J. Cabrales Escobar, R. Rosales Corrales, G. Abreu Suarez. 1996. Prescription of antibiotics for mild acute respiratory infections in children. *Bulletin of the Pan American Health Organization.* 30:106–117.

[6]M. Hugh and G. Corrales. January 1995. Proyecto de servicios de salud descentralizados (SSD) MINSA - USAID. Capacitacion gerencial sobre el manejo de infection respiratoria aguda (CGIRA) - Informe preliminar - Analisis de la CGIRA. [Analysis of the impact of management training on the treatment of ARI - Preliminary report - Analysis of ARI.] Management Sciences for Health.

For ARI and diarrhea treatment in Mexico, an intervention combined group workshops to develop facility-specific standard treatment norms with subsequent practice audits and a peer review panel that monitored adherence to these norms. The interventions resulted in both short-term (3 months) and long-term (18 months) improvements in use of specific indicated and nonindicated drugs, as well as in much greater rates of adherence to standard treatment norms. The Mexico studies demonstrated greater improvements in practice (e.g., antibiotic use in ARI) when the guideline workshops were facilitated by national opinion leaders or by health facility staff opinion leaders than by health system administrators at the state level; however, the state-level intervention was more cost-effective because of its greater scope.

***Problem*:** High cost of drug treatment

Key Points: One of the basic tenets for promoting the IMCI strategy is that the use of standardized treatment guidelines, if followed, will provide cost-effective, appropriate care that is likely to be cheaper than the cost of care if guidelines are not followed. Factors contributing to the high cost of drug treatment include the unnecessary prescribing of multiple drugs, especially antibiotics, over-prescribing of injections, and prescribing of brand name products rather than generics. Also, because many consumers hold the belief that public health facilities have limited stocks of drugs, some consumers bypass the health facility and go directly to private sector drug sellers for drug treatment, choosing the likelihood of greater availability in spite of probable higher costs.

Possible Response: As mentioned earlier, developing a limited drug list or formulary is one of the most effective ways to control drug costs. Promoting the use of generic drugs over brand name products and monitoring prescribing practices for the unnecessary use of antibiotics and instances of polypharmacy can also help to gain control over drug costs.

***Problem*:** Standard treatment guidelines not followed

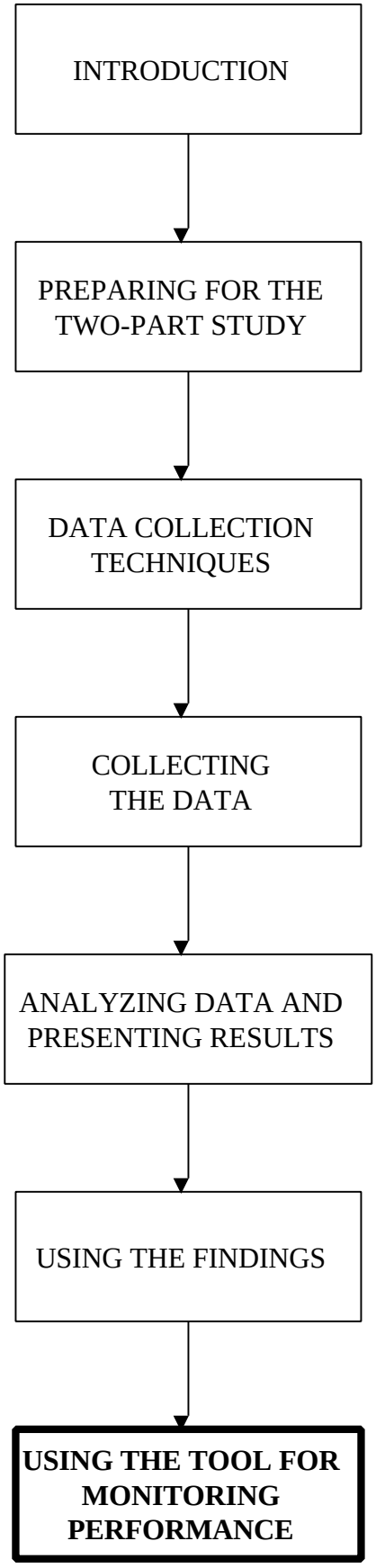
Key Points: Standard treatment guidelines help practitioners or prescribers make decisions about appropriate treatments for specific clinical conditions. Standard guidelines, together with an essential drug list, are powerful tools to promote rational drug use. They can also assist in the standardization of prescribing patterns. The treatment guidelines should include only those drugs for IMCI on the essential drugs list. This will ensure that the supply system, based on the list of essential drugs, supports the treatment guidelines.

WHO has developed a model approach for management of childhood illness. For the purpose of the *DMCI Manual*, the WHO treatment algorithm serves as the standard by which prescribing behaviors are assessed. Each country should adapt the WHO IMCI guidelines to their local context and support their dissemination and implementation.

Possible Response: First, make sure that each facility has an official copy of the adapted WHO IMCI standard treatment guidelines. Group commitment to standards by the staff at a health facility or continuing involvement in peer monitoring may motivate and sustain change. Routine supervision and monitoring, using indicators or simple protocols, and monthly audit and feedback of performance indicators can be effective for improving specific practices.

The reasons for clinically inappropriate drug use practices may be quite complex and multifactorial, including perceived patient demand, cultural misconceptions about drugs, prescribers' limited clinical experience, and the promotion practices of drug representatives. Such practices can also contribute to higher costs. For example, in Ecuador, the DMCI DUS found that the average drug treatment cost for an MOH encounter diagnosed as non-dysentery/non-cholera diarrhea was 335% of the cost of drug treatment recommended by the IMCI guidelines. Health facility records showed that antibiotics were prescribed in 64.9% of MOH encounters diagnosed as non-dysentery/non-cholera diarrhea. In addition to the overuse of antibiotics, the data also suggest a lack of awareness of the importance of ORS in the treatment of diarrhea.

Whatever the childhood illness or behavior may be, interventions should generally be targeted to improving a few specific aspects of drug use. In addition, program managers should involve researchers in the design and implementation of national programs to strengthen and better evaluate their impacts on quality use of medicines.


INTRODUCTION
PREPARING FOR THE TWO-PART STUDY
DATA COLLECTION TECHNIQUES
COLLECTING THE DATA
ANALYZING DATA AND PRESENTING RESULTS
USING THE FINDINGS
USING THE TOOL FOR MONITORING PERFORMANCE

Chapter 7.

USING THE TOOL FOR MONITORING PERFORMANCE

Once the DMCI assessment has been completed and the data analyzed, the findings can represent a source of quantifiable baseline measures. Having baseline measures is critical to monitoring the impact, negative or positive, of any intervention.

It is important to monitor drug availability and use as a way to evaluate the efficacy of an intervention. To determine if adequate progress is being achieved, it is necessary to know what is expected. Interventions should be evaluated by looking for both intended and unintended changes in specific outcomes. For example, an intervention for banning antidiarrheals may lead to an increased use of antibiotics.

The DMCI indicators can be used to supervise and monitor performance. In selecting indicators for monitoring, it is important to consider how the data will be collected. Data for some indicators may be routinely available from standard recording and reporting systems (such as percentage of DMCI tracer drugs available), whereas data for other indicators may require a special survey (such as for the percentage of stock records that correspond with physical counts). Thus, the sources and the costs of collecting and processing these data must be carefully considered in selecting indicators to monitor.

There are a few potential problems that can develop when using indicators for monitoring. Such problems include failure to take action based on findings, over-ambitiousness (using too many indicators), failure to focus on key questions, selecting indicators that are too complex, lack of integration with work planning, failure to build on existing information, and lack of objectivity.

Collecting data on a few specific indicators on a quarterly or semiannual basis should be a key management strategy to measure progress toward improvements in IMCI drug availability and use. By comparing indicator values among districts and among health facilities, it should be possible to measure the impact of an intervention over time and better identify areas of concern that warrant further action.

Once an intervention has been identified, performance targets should be established. A performance target is a desirable and, in principle, attainable standard of practice. The DMCI indicators can be used to measure the extent to which the targets and objectives of an intervention are being attained. For example, the indicator may be the percentage of 15 DMCI tracer drugs in stock, and the performance target may be 80% availability at each level for this list of tracer drugs. Performance targets should be set for each indicator.

When choosing the most useful outcomes to measure, consider the following:

? Select outcomes that can be clearly and explicitly defined.

? Select outcomes that can be reliably measured by the indicator, preferably using routinely collected data.

? Focus on a few important outcomes rather than measuring all possible changes.

? Select the key behaviors targeted by the intervention and the most likely substitute behaviors.

? Measure more than one dimension of success, especially if some changes are secondary—for example, changes in prescribing that follow changes in knowledge about specific drugs.

There are no universal targets of “acceptable” performance. Each country is unique, and setting performance targets will depend on many factors, such as the time frame of the intervention, the human and economic resources available, national policies, and the level of decentralization, to name just a few. Most important, however, is that targets should be established based on agreed-upon standards of performance and according to the local situation.

Following is a list of suggested DMCI indicators that can serve to monitor performance, particularly at the health facility level. The performance target (included only for illustrative purposes) is noted in parentheses following the indicator.

Availability

3. Average percentage of a set of unexpired DMCI tracer drugs available in MOH storage and health facilities (90%)

4. Average percentage of time out of stock for a set of DMCI tracer drugs in MOH storage and health facilities (10%)

5. Average percentage of stock records that correspond with physical counts for a set of DMCI tracer drugs in MOH storage and health facilities (90%)

Use

9. Percentage of encounters diagnosed as no-pneumonia (cough or cold) that are prescribed antibiotics (10%)

13. Percentage of encounters diagnosed as non-dysentery/non-cholera diarrhea that are prescribed antibiotics (10%)

15. Average cost of drugs prescribed as a percentage of costs if IMCI norms for treatment were followed (±10%)

17. Percentage of caregivers who could correctly describe how to give the prescribed medication (90%)

A well-designed monitoring system can usually provide information on what happened or what did not happen. Managers should always check to see whether the information has been used, how it has been used, and what action has been taken.

No monitoring system is complete without feedback. Giving feedback to individual units or staff members tells them how well the reporting has been done and how useful the information is. Feedback also demonstrates the value and importance of reports. As such, it represents one of the most powerful tools for motivating staff.

ANNEXES

ANNEX 1. IMCI GUIDELINES

INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS

SICK CHILD
AGE 2 MONTHS UP TO 5 YEARS

World Health Organization
Department of Child and Adolescent Health and Development (CAH)

unicef

ASSESS AND CLASSIFY THE SICK CHILD

Asses, Classify and Identify Treatment

TREAT THE CHILD

Teach the Mother to Give Oral Drugs at Home

Teach the Mother to Treat Local Infections at Home

Give these Treatments in Clinic Only

TREAT THE CHILD, continued

Give Extra Fluid for Diarrhoea and Continue Feeding

Immunize Every Sick Child, As Needed

Give Follow-up Care

COUNSEL THE MOTHER

Food

Fluid

When to Return

Counsel the Mother About Her Own Health

SICK YOUNG INFANT
AGE 1 WEEK UP TO 2 MONTHS

ASSESS, CLASSIFY AND TREAT THE SICK YOUNG INFANT

Assess, Classify and Identify Treatment

Treat the Young Infant and Counsel the Mother

Give Follow-up Care for the Sick Young Infant

RECORDING FORMS

WEIGHT FOR AGE CHART

ASSESS AND CLASSIFY THE SICK CHILD AGE 2 MONTHS UP TO 5 YEARS

ASSESS

ASK THE MOTHER WHAT THE CHILD'S PROBLEMS ARE

- Determine if this is an initial or follow-up visit for this problem.
  - If follow-up visit, use the follow-up instructions on *TREAT THE CHILD* chart.
  - If initial visit, assess the child as follows:

CHECK FOR GENERAL DANGER SIGNS

ASK:	*LOOK:*
• Is the child able to drink or breastfeed? • Does the child vomit everything? • Has the child had convulsions?	• See if the child is lethargic or unconscious.

A child with any general danger sign needs *URGENT* attention; complete the assessment and any pre-referral treatment immediately so referral is not delayed.

CLASSIFY

USE ALL BOXES THAT MATCH THE CHILD'S SYMPTOMS AND PROBLEMS TO CLASSIFY THE ILLNESS.

IDENTIFY TREATMENT

THEN ASK ABOUT MAIN SYMPTOMS:

Does the child have cough or difficult breathing?

IF YES, ASK:	*LOOK, LISTEN, FEEL:*
• For how long?	• Count the breaths in one minute. • Look for chest indrawing. • Look and listen for stridor.

CHILD MUST BE CALM

Classify COUGH or DIFFICULT BREATHING

If the child is:	Fast breathing is:
2 months up to 12 months	50 breaths per minute or more
12 months up to 5 years	40 breaths per minute or more

SIGNS	CLASSIFY AS	TREATMENT (Urgent pre-referral treatments are in bold print.)
• Any general danger sign or • Chest indrawing or • Stridor in calm child.	**SEVERE PNEUMONIA OR VERY SEVERE DISEASE**	▸ ***Give first dose of an appropriate antibiotic.*** ▸ ***Refer URGENTLY to hospital.****
• Fast breathing.	**PNEUMONIA**	▸ ***Give an appropriate antibiotic for 5 days.*** ▸ Soothe the throat and relieve the cough with a safe remedy. ▸ Advise mother when to return immediately. ▸ Follow-up in 2 days.
No signs of pneumonia or very severe disease.	**NO PNEUMONIA: COUGH OR COLD**	▸ If coughing more than 30 days, refer for assessment. ▸ Soothe the throat and relieve the cough with a safe remedy. ▸ Advise mother when to return immediately. ▸ Follow-up in 5 days if not improving.

Does the child have diarrhoea?

IF YES, ASK:

- For how long?
- Is there blood in the stool?

LOOK AND FEEL:

- Look at the child's general condition. Is the child:

  Lethargic or unconscious?
  Restless and irritable?

- Look for sunken eyes.
- Offer the child fluid. Is the child:

  Not able to drink or drinking poorly?
  Drinking eagerly, thirsty?

- Pinch the skin of the abdomen. Does it go back:

  Very slowly (longer than 2 seconds)?
  Slowly?

Classify DIARRHOEA

for DEHYDRATION

Two of the following signs: • Lethargic or unconscious • Sunken eyes • Not able to drink or drinking poorly • Skin pinch goes back very slowly.	**SEVERE DEHYDRATION**	▶ If child has no other severe classification: - Give fluid for severe dehydration (Plan C). OR ***If child also has another severe classification:*** ***- Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way.*** ***Advise the mother to continue breastfeeding.*** ▶ ***If child is 2 years or older and there is cholera in your area, give antibiotic for cholera.***
Two of the following signs: • Restless, Irritable • Sunken eyes • Drinks eagerly, thirsty • Skin pinch goes back slowly.	**SOME DEHYDRATION**	▶ Give fluid and food for some dehydration (Plan B). ▶ ***If child also has a severe classification:*** ***- Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way.*** ***Advise mother to continue breastfeeding.*** ▶ Advise mother when to return immediately. ▶ Follow-up in 5 days if not improving.
Not enough signs to classify as some or severe dehydration.	**NO DEHYDRATION**	▶ Give fluid and food to treat diarrhoea at home (Plan A). ▶ Advise mother when to return immediately. ▶ Follow-up in 5 days if not improving.

and if diarrhoea 14 days or more

• Dehydration present.	**SEVERE PERSISTENT DIARRHOEA**	▶ Treat dehydration before referral unless the child has another severe classification. ▶ Refer to hospital.
• No dehydration.	**PERSISTENT DIARRHOEA**	▶ Advise the mother on feeding a child who has PERSISTENT DIARRHOEA. ▶ Follow-up in 5 days.

and if blood in stool

• Blood in the stool.	**DYSENTERY**	▶ ***Treat for 5 days with an oral antibiotic recommended for Shigella in your area.*** ▶ Follow-up in 2 days.

If referral is not possible, manage the child as described in **Integrated Management of Childhood Illness, Treat the Child, Annex: Where Referral Is Not Possible, and WHO guidelines for Inpatient care.*

Does the child have fever?

(by history or feels hot or temperature 37.5˚C** or above)

IF YES:
Decide Malaria Risk: high or low

THEN ASK:	***LOOK AND FEEL:***
• For how long? • If more than 7 days, has fever been present every day? • Has the child had measles within the last 3 months?	• Look or feel for stiff neck. • Look for runny nose. Look for signs of MEASLES • Generalized rash and • One of these: cough, runny nose, or red eyes.
If the child has measles now or within the last 3 months:	• Look for mouth ulcers. Are they deep and extensive? • Look for pus draining from the eye. • Look for clouding of the cornea.

Classify FEVER

High Malaria Risk

HIGH MALARIA RISK

• Any general danger sign or • Stiff neck.	**VERY SEVERE FEBRILE DISEASE**	▸ ***Give quinine for severe malaria (first dose).*** ▸ ***Give first dose of an appropriate antibiotic.*** ▸ ***Treat the child to prevent low blood sugar.*** ▸ ***Give one dose of paracetamol in clinic for high fever (38.5˚ C or above).*** ▸ ***Refer URGENTLY to hospital.***
• Fever (by history or feels hot or temperature 37.5˚C** or above).	**MALARIA**	▸ ***If NO cough with fast breathing, treat with oral antimalarial.*** ***OR*** ***If cough with fast breathing, treat with cotrimoxazole for 5 days.*** ▸ ***Give one dose of paracetamol in clinic for high fever (38.5˚ C or above).*** ▸ Advise mother when to return immediately. ▸ Follow-up in 2 days if fever persists. ▸ If fever is present every day for more than 7 days, refer for assessment.

Low Malaria Risk

LOW MALARIA RISK

• Any general danger sign or • Stiff neck.	**VERY SEVERE FEBRILE DISEASE**	▸ ***Give quinine for severe malaria (first dose) unless no malaria risk.*** ▸ ***Give first dose of an appropriate antibiotic.*** ▸ ***Treat the child to prevent low blood sugar.*** ▸ ***Give one dose of paracetamol in clinic for high fever (38.5˚ C or above).*** ▸ ***Refer URGENTLY to hospital.***
• NO runny nose and NO measles and NO other cause of fever.	**MALARIA**	▸ ***If NO cough with fast breathing, treat with oral antimalarial.*** ***OR*** ***If cough with fast breathing, treat with cotrimoxazole for 5 days.*** ▸ ***Give one dose of paracetamol in clinic for high fever (38.5˚ C or above).*** ▸ Advise mother when to return immediately. ▸ Follow-up in 2 days if fever persists. ▸ If fever is present every day for more than 7 days, refer for assessment.
• Runny nose PRESENT or • Measles PRESENT or • Other cause of fever PRESENT.	**FEVER - MALARIA UNLIKELY**	▸ ***Give one dose of paracetamol in clinic for high fever (38.5˚ C or above).*** ▸ Advise mother when to return immediately. ▸ Follow-up in 2 days if fever persists. ▸ If fever is present every day for more than 7 days, refer for assessment.

If MEASLES now or within last 3 months, Classify

• Any general danger sign or • Clouding of cornea or • Deep or extensive mouth ulcers.	**SEVERE COMPLICATED MEASLES*** **	▸ ***Give Vitamin A.*** ▸ ***Give first dose of an appropriate antibiotic.*** ▸ ***If clouding of the cornea or pus draining from the eye, apply tetracycline eye ointment.*** ▸ ***Refer URGENTLY to hospital.***
• Pus draining from the eye or • Mouth ulcers.	**MEASLES WITH EYE OR MOUTH COMPLICATIONS*** **	▸ ***Give Vitamin A.*** ▸ ***If pus draining from the eye, treat eye infection with tetracycline eye ointment.*** ▸ If mouth ulcers, treat with gentian violet. ▸ Follow-up in 2 days.
• Measles now or within the last 3 months.	**MEASLES**	▸ ***Give Vitamin A.***

*** These temperatures are based on axillary temperature. Rectal temperature readings are approximately 0.5˚ C higher.*

Does the child have an ear problem?

IF YES, ASK:	*LOOK AND FEEL:*
• Is there ear pain? • Is there ear discharge? If yes, for how long?	• Look for pus draining from the ear. • Feel for tender swelling behind the ear.

Classify EAR PROBLEM

• Tender swelling behind the ear.	**MASTOIDITIS**	▶ ***Give first dose of an appropriate antibiotic.*** ▶ ***Give first dose of paracetamol for pain.*** ▶ ***Refer URGENTLY to hospital.***
• Pus is seen draining from the ear and discharge is reported for less than 14 days, or • Ear pain.	**ACUTE EAR INFECTION**	▶ ***Give an antibiotic for 5 days.*** ▶ Give paracetamol for pain. ▶ Dry the ear by wicking. ▶ Follow-up in 5 days.
• Pus is seen draining from the ear and discharge is reported for 14 days or more.	**CHRONIC EAR INFECTION**	▶ Dry the ear by wicking. ▶ Follow-up in 5 days.
• No ear pain and No pus seen draining from the ear.	**NO EAR INFECTION**	No additional treatment.

THEN CHECK FOR MALNUTRITION AND ANAEMIA

LOOK AND FEEL:

- Look for visible severe wasting.
- Look for palmar pallor. Is it:

  Severe palmar pallor?
  Some palmar pallor?
- Look for oedema of both feet.
- Determine weight for age.

Classify NUTRITIONAL STATUS

• Visible severe wasting or • Severe palmar pallor or • Oedema of both feet.	**SEVERE MALNUTRITION OR SEVERE ANAEMIA**	▶ ***Give Vitamin A.*** ▶ ***Refer URGENTLY to hospital.***
• Some palmar pallor or • Very low weight for age.	**ANAEMIA OR VERY LOW WEIGHT**	▶ Assess the child's feeding and counsel the mother on feeding according to the FOOD box on the *COUNSEL THE MOTHER* chart. - If feeding problem, follow-up in 5 days. ▶ If pallor: - Give iron. - ***Give oral antimalarial if high malaria risk.*** - Give mebendazole if child is 2 years or older and has not had a dose in the previous 6 months. ▶ Advise mother when to return immediately. ▶ If pallor, follow-up in 14 days. If very low weight for age, follow-up in 30 days.
• Not very low weight for age and no other signs of malnutrition.	**NO ANAEMIA AND NOT VERY LOW WEIGHT**	▶ If child is less than 2 years old, assess the child's feeding and counsel the mother on feeding according to the FOOD box on the *COUNSEL THE MOTHER* chart. - If feeding problem, follow-up in 5 days. ▶ Advise mother when to return immediately.

THEN CHECK THE CHILD'S IMMUNIZATION STATUS

IMMUNIZATION SCHEDULE:

AGE	VACCINE	
Birth	BCG	OPV-0
6 weeks	DPT-1	OPV-1
10 weeks	DPT-2	OPV-2
14 weeks	DPT-3	OPV-3
9 months	Measles	

ASSESS OTHER PROBLEMS

MAKE SURE CHILD WITH ANY GENERAL DANGER SIGN IS REFERRED after first dose of an appropriate antibiotic and other urgent treatments.

Exception: Rehydration of the child according to Plan C may resolve danger signs so that referral is no longer needed.

TREAT THE CHILD

CARRY OUT THE TREATMENT STEPS IDENTIFIED ON THE *ASSESS AND CLASSIFY* CHART

TEACH THE MOTHER TO GIVE ORAL DRUGS AT HOME

Follow the instructions below for every oral drug to be given at home. Also follow the instructions listed with each drug's dosage table.

- **Determine the appropriate drugs and dosage for the child's age or weight.**
- **Tell the mother the reason for giving the drug to the child.**
- **Demonstrate how to measure a dose.**
- **Watch the mother practise measuring a dose by herself.**
- **Ask the mother to give the first dose to her child.**
- **Explain carefully how to give the drug, then label and package the drug.**
- **If more than one drug will be given, collect, count and package each drug separately.**
- **Explain that all the oral drug tablets or syrups must be used to finish the course of treatment, even if the child gets better.**
- **Check the mother's understanding before she leaves the clinic.**

▶ *Give an Appropriate Oral Antibiotic*

▶ FOR PNEUMONIA, ACUTE EAR INFECTION OR VERY SEVERE DISEASE:

FIRST-LINE ANTIBIOTIC: .....

SECOND-LINE ANTIBIOTIC: .....

	COTRIMOXAZOLE (trimethoprim + sulphamethoxazole) ▶ Give two times daily for 5 days			AMOXYCILLIN ▶ Give three times daily for 5 days.	
AGE or WEIGHT	**ADULT TABLET** 80 mg trimethoprim + 400 mg sulphamethoxazole	**PEDIATRIC TABLET** 20 mg trimethoprim + 100 mg sulphamethoxazole	**SYRUP** 40 mg trimethoprim + 200 mg sulphamethoxazole per 5 ml	**TABLET** 250 mg	**SYRUP** 125 mg per 5 ml
2 months up to 12 months (4 - < 10 kg)	1/2	2	5.0 ml	1/2	5 ml
12 months up to 5 years (10 -19 kg)	1	3	7.5 ml	1	10 ml

▶ FOR DYSENTERY:

Give antibiotic recommended for Shigella in your area for 5 days.

FIRST-LINE ANTIBIOTIC FOR SHIGELLA: .....

SECOND-LINE ANTIBIOTIC FOR SHIGELLA: .....

	COTRIMOXAZOLE (trimethoprim + sulphamethoxazole) ▶ Give two times daily for 5 days	NALIDIXIC ACID ▶ Give four times daily for 5 days
AGE or WEIGHT		**TABLET** 500 mg
2 months up to 4 months (4 - < 6 kg)	**See doses above**	1/4
4 months up to 12 months (6 - < 10 kg)		1/4
12 months up to 5 years (10 - 19 kg)		1/2

▶ FOR CHOLERA:

Give antibiotic recommended for Cholera in your area for 3 days.

FIRST-LINE ANTIBIOTIC FOR CHOLERA: .....

SECOND-LINE ANTIBIOTIC FOR CHOLERA: .....

	TETRACYCLINE ▶ Give four times daily for 3 days	COTRIMOXAZOLE (trimethoprim + sulphamethoxazole) ▶ Give two times daily for 3 days	ERYTHROMYCIN ▶ Give four times daily for 3 days	FURAZOLIDONE ▶ Give four times daily for 3 days
AGE or WEIGHT	**TABLET** 250 mg		**TABLET** 250 mg	**TABLET** 100 mg
2 months up to 4 months (4 - < 6 kg)		**See doses above**	1/4	
4 months up to 12 months (6 - < 10 kg)	1/2		1/2	
12 months up to 5 years (10 - 19 kg)	1		1	1/4

TEACH THE MOTHER TO GIVE ORAL DRUGS AT HOME

Follow the instructions below for every oral drug to be given at home.
Also follow the instructions listed with each drug's dosage table.

▶ Give an Oral Antimalarial

FIRST-LINE ANTIMALARIAL: _____

SECOND-LINE ANTIMALARIAL: _____

▶ **IF CHLOROQUINE:**

- Explain to the mother that she should watch her child carefully for 30 minutes after giving a dose of chloroquine. If the child vomits within 30 minutes, she should repeat the dose and return to the clinic for additional tablets.
- Explain that itching is a possible side effect of the drug, but is not dangerous.

▶ **IF SULFADOXINE + PYRIMETHAMINE:** Give single dose in clinic.

AGE or WEIGHT	CHLOROQUINE ▶ Give for 3 days									SULFADOXINE + PYRIMETHAMINE ▶ Give single dose in clinic
	TABLET (150 mg base)			TABLET (100 mg base)			SYRUP (50 mg base per 5 ml)			TABLET (500 mg sulfadoxine + 25 mg pyrimethamine)
	DAY 1	DAY 2	DAY 3	DAY 1	DAY 2	DAY 3	DAY 1	DAY 2	DAY 3	
2 months up to 12 months (4 - < 10 kg)	1/2	1/2	1/2	1	1	1/2	7.5 ml	7.5 ml	5.0 ml	1/2
12 months up to 3 years (10 - < 14 kg)	1	1	1/2	1 1/2	1 1/2	1/2	15.0 ml	15.0 ml	5.0 ml	1
3 years up to 5 years (14 - 19 kg)	1 1/2	1 1/2	1/2	2	2	1				1

▶ Give Paracetamol for High Fever (≥ 38.5°C) or Ear Pain

▶ Give paracetamol every 6 hours until high fever or ear pain is gone.

PARACETAMOL		
AGE or WEIGHT	TABLET (100 mg)	TABLET (500 mg)
2 months up to 3 years (4 - < 14 kg)	1	1/4
3 years up to 5 years (14 - 19 kg)	1 1/2	1/2

▶ Give Vitamin A

▶ Give two doses.

- Give first dose in clinic.
- Give mother one dose to give at home the next day.

AGE	VITAMIN A CAPSULES			VITAMIN A SYRUP
	200 000 IU	100 000 IU	50 000 IU	Concentration: _____
Up to 6 months		1/2 capsule	1 capsule	
6 months up to 12 months	1/2 capsule	1 capsule	2 capsules	
12 months up to 5 years	1 capsule	2 capsules	4 capsules	

▶ Give Iron

▶ Give one dose daily for 14 days.

AGE or WEIGHT	IRON/FOLATE TABLET Ferrous sulfate 200 mg + 250 mcg Folate (60 mg elemental iron)	IRON SYRUP Ferrous fumarate 100 mg per 5 ml (20 mg elemental iron per ml)
2 months up to 4 months (4 - < 6 kg)		1.00 ml (< 1/4 tsp.)
4 months up to 12 months (6 - < 10 kg)		1.25 ml (1/4 tsp.)
12 months up to 3 years (10 - < 14 kg)	1/2 tablet	2.00 ml (< 1/2 tsp.)
3 years up to 5 years (14 - 19 kg)	1/2 tablet	2.5 ml (1/2 tsp.)

▶ Give Mebendazole

▶ Give 500 mg mebendazole as a single dose in clinic if:

- hookworm/whipworm are a problem in children in your area, and
- the child is 2 years of age or older, and
- the child has not had a dose in the previous 6 months.

TEACH THE MOTHER TO TREAT LOCAL INFECTIONS AT HOME

- **Explain to the mother what the treatment is and why it should be given.**
- **Describe the treatment steps listed in the appropriate box.**
- **Watch the mother as she does the first treatment in the clinic (except remedy for cough or sore throat).**
- **Tell her how often to do the treatment at home.**
- **If needed for treatment at home, give mother the tube of tetracycline ointment or a small bottle of gentian violet.**
- **Check the mother's understanding before she leaves the clinic.**

▶ *Treat Eye Infection with Tetracycline Eye Ointment*

- ▶ Clean both eyes 3 times daily.
  - Wash hands.
  - Ask child to close the eye.
  - Use clean cloth and water to gently wipe away pus.
- ▶ Then apply tetracycline eye ointment in both eyes 3 times daily.
  - Ask the child to look up.
  - Squirt a small amount of ointment on the inside of the lower lid.
  - Wash hands again.
- ▶ Treat until redness is gone.
- ▶ Do not use other eye ointments or drops, or put anything else in the eye.

▶ *Dry the Ear by Wicking*

- ▶ Dry the ear at least 3 times daily.
  - Roll clean absorbent cloth or soft, strong tissue paper into a wick.
  - Place the wick in the child's ear.
  - Remove the wick when wet.
  - Replace the wick with a clean one and repeat these steps until the ear is dry.

▶ *Treat Mouth Ulcers with Gentian Violet*

- ▶ Treat the mouth ulcers twice daily.
  - Wash hands.
  - Wash the child's mouth with clean soft cloth wrapped around the finger and wet with salt water.
  - Paint the mouth with gentian violet.
  - Wash hands again.

▶ *Soothe the Throat, Relieve the Cough with a Safe Remedy*

- Safe remedies to recommend:
  - Breastmilk for exclusively breastfed infant.

  _____

  _____
- Harmful remedies to discourage: _____

  _____

  _____

GIVE THESE TREATMENTS IN CLINIC ONLY

- **Explain to the mother why the drug is given.**
- **Determine the dose appropriate for the child's weight (or age).**
- **Use a sterile needle and sterile syringe. Measure the dose accurately.**
- **Give the drug as an intramuscular injection.**
- **If child cannot be referred, follow the instructions provided.**

▶ *Give An Intramuscular Antibiotic*

FOR CHILDREN BEING REFERRED URGENTLY WHO CANNOT TAKE AN ORAL ANTIBIOTIC:

- ▶ Give first dose of intramuscular chloramphenicol and refer child urgently to hospital.

IF REFERRAL IS NOT POSSIBLE:

- ▶ Repeat the chloramphenicol injection every 12 hours for 5 days.
- ▶ Then change to an appropriate oral antibiotic to complete 10 days of treatment.

AGE or WEIGHT	CHLORAMPHENICOL Dose: 40 mg per kg Add 5.0 ml sterile water to vial containing 1000 mg = 5.6 ml at 180 mg/ml
2 months up to 4 months (4 - < 6 kg)	1.0 ml = 180 mg
4 months up to 9 months (6 - < 8 kg)	1.5 ml = 270 mg
9 months up to 12 months (8 - < 10 kg)	2.0 ml = 360 mg
12 months up to 3 years (10 - < 14 kg)	2.5 ml = 450 mg
3 years up to 5 years (14 - 19 kg)	3.5 ml = 630 mg

▶ *Give Quinine for Severe Malaria*

FOR CHILDREN BEING REFERRED WTH VERY SEVERE FEBRILE DISEASE:

- ▶ Check which quinine formulation is available in your clinic.
- ▶ Give first dose of intramuscular quinine and refer child urgently to hospital.

IF REFERRAL IS NOT POSSIBLE:

- ▶ Give first dose of intramuscular quinine.
- ▶ The child should remain lying down for one hour.
- ▶ Repeat the quinine injection at 4 and 8 hours later, and then every 12 hours until the child is able to take an oral antimalarial. Do not continue quinine injections for more than 1 week.
- ▶ If low risk of malaria, do not give quinine to a child less than 4 months of age.

AGE or WEIGHT	INTRAMUSCULAR QUININE	
	150 mg/ml* (in 2 ml ampoules)	300 mg/ml* (in 2 ml ampoules)
2 months up to 4 months (4 - < 6 kg)	0.4 ml	0.2 ml
4 months up to 12 months (6 - < 10 kg)	0.6 ml	0.3 ml
12 months up to 2 years (10 - < 12 kg)	0.8 ml	0.4 ml
2 years up to 3 years (12 - < 14 kg)	1.0 ml	0.5 ml
3 years up to 5 years (14 - 19 kg)	1.2 ml	0.6 ml

* *quinine salt*

▶ *Treat the Child to Prevent Low Blood Sugar*

- ***If the child is able to breastfeed:***

  Ask the mother to breastfeed the child.

- ***If the child is not able to breastfeed but is able to swallow:***

  Give expressed breastmilk or a breastmilk substitute.
  If neither of these is available, give sugar water.
  Give 30-50 ml of milk or sugar water before departure.

  To make sugar water: Dissolve 4 level teaspoons of sugar (20 grams) in a 200-ml cup of clean water.

- ***If the child is not able to swallow:***

  Give 50 ml of milk or sugar water by nasogastric tube.

GIVE EXTRA FLUID FOR DIARRHOEA AND CONTINUE FEEDING

(See FOOD advice on COUNSEL THE MOTHER chart)

▶ *Plan A: Treat Diarrhoea at Home*

Counsel the mother on the 3 Rules of Home Treatment: Give Extra Fluid, Continue Feeding, When to Return

1. ***GIVE EXTRA FLUID*** (as much as the child will take)

▸ **TELL THE MOTHER:**
- Breastfeed frequently and for longer at each feed.
- If the child is exclusively breastfed, give ORS or clean water in addition to breastmilk.
- If the child is not exclusively breastfed, give one or more of the following: ORS solution, food-based fluids (such as soup, rice water, and yoghurt drinks), or clean water.

It is especially important to give ORS at home when:
- *the child has been treated with Plan B or Plan C during this visit.*
- *the child cannot return to a clinic if the diarrhoea gets worse.*

▸ **TEACH THE MOTHER HOW TO MIX AND GIVE ORS. GIVE THE MOTHER 2 PACKETS OF ORS TO USE AT HOME.**

▸ **SHOW THE MOTHER HOW MUCH FLUID TO GIVE IN ADDITION TO THE USUAL FLUID INTAKE:**

Up to 2 years	50 to 100 ml after each loose stool
2 years or more	100 to 200 ml after each loose stool

Tell the mother to:
- Give frequent small sips from a cup.
- If the child vomits, wait 10 minutes. Then continue, but more slowly.
- Continue giving extra fluid until the diarrhoea stops.

2. ***CONTINUE FEEDING***
3. ***WHEN TO RETURN***

} See ***COUNSEL THE MOTHER*** chart

▶ *Plan B: Treat Some Dehydration with ORS*

Give in clinic recommended amount of ORS over 4-hour period

▸ **DETERMINE AMOUNT OF ORS TO GIVE DURING FIRST 4 HOURS.**

AGE*	Up to 4 months	4 months up to 12 months	12 months up to 2 years	2 years up to 5 years
WEIGHT	< 6 kg	6 - < 10 kg	10 - < 12 kg	12 - 19 kg
In ml	200 - 400	400 - 700	700 - 900	900 - 1400

* *Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) times 75.*

- If the child wants more ORS than shown, give more.
- For infants under 6 months who are not breastfed, also give 100-200 ml clean water during this period.

▸ **SHOW THE MOTHER HOW TO GIVE ORS SOLUTION.**
- Give frequent small sips from a cup.
- If the child vomits, wait 10 minutes. Then continue, but more slowly.
- Continue breastfeeding whenever the child wants.

▸ **AFTER 4 HOURS:**
- Reassess the child and classify the child for dehydration.
- Select the appropriate plan to continue treatment.
- Begin feeding the child in clinic.

▸ **IF THE MOTHER MUST LEAVE BEFORE COMPLETING TREATMENT:**
- Show her how to prepare ORS solution at home.
- Show her how much ORS to give to finish the 4-hour treatment at home.
- Give her enough ORS packets to complete rehydration. Also give her 2 packets as recommended in Plan A.
- Explain the 3 Rules of Home Treatment:

1. ***GIVE EXTRA FLUID***
2. ***CONTINUE FEEDING***
3. ***WHEN TO RETURN***

} **See Plan A for recommended fluids and See *COUNSEL THE MOTHER* chart**

GIVE EXTRA FLUID FOR DIARRHOEA AND CONTINUE FEEDING

(See FOOD advice on COUNSEL THE MOTHER chart)

▶ *Plan C: Treat Severe Dehydration Quickly*

▶ **FOLLOW THE ARROWS. IF ANSWER IS "YES", GO ACROSS. IF "NO", GO DOWN.**

START HERE

Can you give intravenous (IV) fluid immediately?

YES ▶

- Start IV fluid immediately. If the child can drink, give ORS by mouth while the drip is set up. Give 100 ml/kg Ringer's Lactate Solution (or, if not available, normal saline), divided as follows:

AGE	First give 30 ml/kg in:	Then give 70 ml/kg in:
Infants (under 12 months)	1 hour*	5 hours
Children (12 months up to 5 years)	30 minutes*	2 1/2 hours

**Repeat once if radial pulse is still very weak or not detectable.*

- Reassess the child every 1-2 hours. If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2 hours (children).
- Reassess an infant after 6 hours and a child after 3 hours. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.

NO ▼

Is IV treatment available nearby (within 30 minutes)?

YES ▶

- Refer URGENTLY to hospital for IV treatment.
- If the child can drink, provide the mother with ORS solution and show her how to give frequent sips during the trip.

NO ▼

Are you trained to use a naso-gastric (NG) tube for rehydration?

YES ▶

- Start rehydration by tube (or mouth) with ORS solution: give 20ml/kg/hour for 6 hours (total of 120 ml/kg).
- Reassess the child every 1-2 hours:
  - If there is repeated vomiting or increasing abdominal distension, give the fluid more slowly.
  - If hydration status is not improving after 3 hours, send the child for IV therapy.
- After 6 hours, reassess the child. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.

NO ▼

Can the child drink?

NO ▼

Refer URGENTLY to hospital for IV or NG treatment.

NOTE:

- If possible, observe the child at least 6 hours after rehydration to be sure the mother can maintain hydration giving the child ORS solution by mouth.

IMMUNIZE EVERY SICK CHILD, AS NEEDED

GIVE FOLLOW-UP CARE

- **Care for the child who returns for follow-up using all the boxes that match the child's previous classifications.**
- **If the child has any new problem, assess, classify and treat the new problem as on the *ASSESS AND CLASSIFY* chart.**

▶ PNEUMONIA

After 2 days:

Check the child for general danger signs.
Assess the child for cough or difficult breathing. } *See ASSESS & CLASSIFY chart.*

Ask:
- Is the child breathing slower?
- Is there less fever?
- Is the child eating better?

Treatment:

- If ***chest indrawing or a general danger sign***, give a dose of second-line antibiotic or intramuscular chloramphenicol. Then refer URGENTLY to hospital.
- If ***breathing rate, fever, and eating are the same***, change to the second-line antibiotic and advise the mother to return in 2 days or refer. (If this child had measles within the last 3 months, refer.)
- If ***breathing slower, less fever, or eating better***, complete the 5 days of antibiotic.

▶ PERSISTENT DIARRHOEA

After 5 days:

Ask:
- Has the diarrhoea stopped?
- How many loose stools is the child having per day?

Treatment:

- If ***the diarrhoea has not stopped (child is still having 3 or more loose stools per day)***, do a full reassessment of the child. Give any treatment needed. Then refer to hospital.
- If ***the diarrhoea has stopped (child having less than 3 loose stools per day)***, tell the mother to follow the usual feeding recommendations for the child's age.

▶ DYSENTERY

After 2 days:

Assess the child for diarrhoea. > *See ASSESS & CLASSIFY chart.*

Ask:
- Are there fewer stools?
- Is there less blood in the stool?
- Is there less fever?
- Is there less abdominal pain?
- Is the child eating better?

Treatment:

- If the child is ***dehydrated***, treat dehydration.
- If ***number of stools, amount of blood in stools, fever, abdominal pain, or eating is the same or worse:***

  Change to second-line oral antibiotic recommended for Shigella in your area. Give it for 5 days. Advise the mother to return in 2 days.

  Exceptions - If the child: - is less than 12 months old, or
  - was dehydrated on the first visit, or
  - had measles within the last 3 months

  } Refer to hospital.

- If ***fewer stools, less blood in the stools, less fever, less abdominal pain, and eating better***, continue giving the same antibiotic until finished.

GIVE FOLLOW-UP CARE

- **Care for the child who returns for follow-up using all the boxes that match the child's previous classifications.**
- **If the child has any new problem, assess, classify and treat the new problem as on the *ASSESS AND CLASSIFY* chart.**

▶MALARIA (Low or High Malaria Risk)

If fever persists after 2 days, or returns within 14 days:

Do a full reassessment of the child. > *See ASSESS & CLASSIFY chart.*
Assess for other causes of fever.

Treatment:

- If the child has ***any general danger sign or stiff neck***, treat as VERY SEVERE FEBRILE DISEASE.
- If the child has any ***cause of fever other than malaria***, provide treatment.
- If ***malaria is the only apparent cause of fever:***
  - Treat with the second-line oral antimalarial. (If no second-line antimalarial is available, refer to hospital.) Advise the mother to return again in 2 days if the fever persists.
  - If fever has been present for 7 days, refer for assessment.

▶FEVER-MALARIA UNLIKELY (Low Malaria Risk)

If fever persists after 2 days:

Do a full reassessment of the child. > *See ASSESS & CLASSIFY chart.*
Assess for other causes of fever.

Treatment:

- If the child has ***any general danger sign or stiff neck***, treat as VERY SEVERE FEBRILE DISEASE.
- If the child has any ***cause of fever other than malaria***, provide treatment.
- If ***malaria is the only apparent cause of fever:***
  - Treat with first-line oral antimalarial. Advise the mother to return again in 2 days if the fever persists.
  - If fever has been present for 7 days, refer for assessment.

▶MEASLES WITH EYE OR MOUTH COMPLICATIONS

After 2 days:

Look for red eyes and pus draining from the eyes.
Look at mouth ulcers.
Smell the mouth.

Treatment for Eye Infection:

- If ***pus is still draining from the eye***, ask the mother to describe how she has treated the eye infection. If treatment has been correct, refer to hospital. If treatment has not been correct, teach the mother correct treatment.
- If ***the pus is gone but redness remains***, continue the treatment.
- If ***no pus or redness***, stop the treatment.

Treatment for Mouth Ulcers:

- If ***mouth ulcers are worse, or there is a very foul smell from the mouth***, refer to hospital.
- If ***mouth ulcers are the same or better***, continue gentian violet for a total of 5 days.

GIVE FOLLOW-UP CARE

- **Care for the child who returns for follow-up using all the boxes that match the child's previous classifications.**
- **If the child has any new problem, assess, classify and treat the new problem as on the *ASSESS AND CLASSIFY* chart.**

▶EAR INFECTION

After 5 days:

Reassess for ear problem. > *See ASSESS & CLASSIFY chart.*
Measure the child's temperature.

Treatment:

- If there is ***tender swelling behind the ear or high fever (38.5° C or above)***, refer URGENTLY to hospital.
- ***Acute ear infection:*** If ***ear pain or discharge*** persists, treat with 5 more days of the same antibiotic. Continue wicking to dry the ear. Follow-up in 5 days.
- ***Chronic ear infection:*** Check that the mother is wicking the ear correctly. Encourage her to continue.
- If ***no ear pain or discharge***, praise the mother for her careful treatment. If she has not yet finished the 5 days of antibiotic, tell her to use all of it before stopping.

▶FEEDING PROBLEM

After 5 days:

Reassess feeding. > *See questions at the top of the COUNSEL chart.*
Ask about any feeding problems found on the initial visit.

- Counsel the mother about any new or continuing feeding problems. If you counsel the mother to make significant changes in feeding, ask her to bring the child back again.
- If the child is very low weight for age, ask the mother to return 30 days after the initial visit to measure the child's weight gain.

▶PALLOR

After 14 days:

- Give iron. Advise mother to return in 14 days for more iron.
- Continue giving iron every 14 days for 2 months.
- If the child has palmar pallor after 2 months, refer for assessment.

▶VERY LOW WEIGHT

After 30 days:

Weigh the child and determine if the child is still very low weight for age.
Reassess feeding. > *See questions at the top of the COUNSEL chart.*

Treatment:

- If the child is ***no longer very low weight for age***, praise the mother and encourage her to continue.
- If the child is still ***very low weight for age***, counsel the mother about any feeding problem found. Ask the mother to return again in one month. Continue to see the child monthly until the child is feeding well and gaining weight regularly or is no longer very low weight for age.

Exception:
If you do not think that feeding will improve, or if the child has ***lost weight***, refer the child.

IF ANY MORE FOLLOW-UP VISITS ARE NEEDED
BASED ON THE INITIAL VISIT OR THIS VISIT,
ADVISE THE MOTHER OF THE
NEXT FOLLOW-UP VISIT.

•

ALSO, ADVISE THE MOTHER
WHEN TO RETURN IMMEDIATELY.
(SEE *COUNSEL* CHART.)

COUNSEL THE MOTHER

FOOD

▶ *Assess the Child's Feeding*

Ask questions about the child's usual feeding and feeding during this illness. Compare the mother's answers to the ***Feeding Recommendations*** for the child's age in the box below.

ASK -

- Do you breastfeed your child?
  - How many times during the day?
  - Do you also breastfeed during the night?
- Does the child take any other food or fluids?
  - What food or fluids?
  - How many times per day?
  - What do you use to feed the child?
  - If very low weight for age: How large are servings? Does the child receive his own serving? Who feeds the child and how?
- During this illness, has the child's feeding changed? If yes, how?

▶ *Feeding Recommendations During Sickness and Health*

Up to 4 Months of Age

- Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours.
- Do not give other foods or fluids.

4 Months up to 6 Months

- Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours.
- Only if the child:
  - shows interest in semisolid foods, or
  - appears hungry after breastfeeding, or
  - is not gaining weight adequately,

  add complementary foods (listed under 6 months up to 12 months).

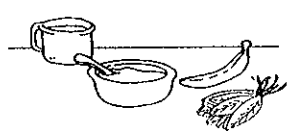
  Give these foods 1 or 2 times per day after breastfeeding.

6 Months up to 12 Months

- Breastfeed as often as the child wants.
- Give adequate servings of:

  _____
  _____
  _____
  _____*

  - 3 times per day if breastfed;
  - 5 times per day if not breastfed.

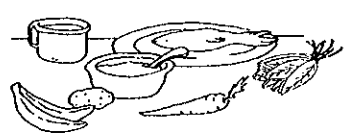


12 Months up to 2 Years

- Breastfeed as often as the child wants.
- Give adequate servings of:

  _____
  _____
  _____
  _____
  _____*

  or family foods 5 times per day.



2 Years and Older

- Give family foods at 3 meals each day. Also, twice daily, give nutritious food between meals, such as:

  _____
  _____
  _____
  _____
  _____

* *A good daily diet should be adequate in quantity and include an energy-rich food (for example, thick cereal with added oil); meat, fish, eggs, or pulses; and fruits and vegetables.*

Feeding Recommendations For a Child Who Has PERSISTENT DIARRHOEA

- If still breastfeeding, give more frequent, longer breastfeeds, day and night.
- If taking other milk:
  - replace with increased breastfeeding OR
  - replace with fermented milk products, such as yoghurt OR
  - replace half the milk with nutrient-rich semisolid food.
- For other foods, follow feeding recommendations for the child's age.

▶ *Counsel the Mother About Feeding Problems*

If the child is not being fed as described in the above recommendations, counsel the mother accordingly. In addition:

- **If the mother reports difficulty with breastfeeding, assess breastfeeding. (See *YOUNG INFANT* chart.) As needed, show the mother correct positioning and attachment for breastfeeding.**
- **If the child is less than 4 months old and is taking other milk or foods:**

  - Build mother's confidence that she can produce all the breastmilk that the child needs.
  - Suggest giving more frequent, longer breastfeeds, day and night, and gradually reducing other milk or foods.

  If other milk needs to be continued, counsel the mother to:

  - Breastfeed as much as possible, including at night.
  - Make sure that other milk is a locally appropriate breastmilk substitute.
  - Make sure other milk is correctly and hygienically prepared and given in adequate amounts.
  - Finish prepared milk within an hour.

- **If the mother is using a bottle to feed the child:**

  - Recommend substituting a cup for bottle.
  - Show the mother how to feed the child with a cup.

- **If the child is not being fed actively, counsel the mother to:**

  - Sit with the child and encourage eating.
  - Give the child an adequate serving in a separate plate or bowl.

- **If the child is not feeding well during illness, counsel the mother to:**

  - Breastfeed more frequently and for longer if possible.
  - Use soft, varied, appetizing, favourite foods to encourage the child to eat as much as possible, and offer frequent small feedings.
  - Clear a blocked nose if it interferes with feeding.
  - Expect that appetite will improve as child gets better.

- **Follow-up any feeding problem in 5 days.**

FLUID

▶ *Advise the Mother to Increase Fluid During Illness*

FOR ANY SICK CHILD:

- Breastfeed more frequently and for longer at each feed.
- Increase fluid. For example, give soup, rice water, yoghurt drinks or clean water.

FOR CHILD WITH DIARRHOEA:

- Giving extra fluid can be lifesaving. Give fluid according to Plan A or Plan B on *TREAT THE CHILD* chart.

WHEN TO RETURN

▶ *Advise the Mother When to Return to Health Worker*

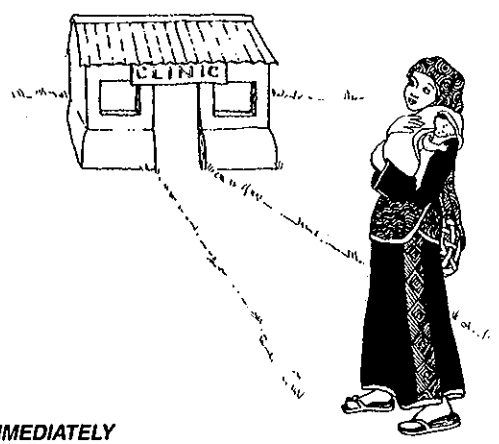
FOLLOW-UP VISIT

Advise the mother to come for follow-up at the earliest time listed for the child's problems.

If the child has:	Return for follow-up in:
PNEUMONIA DYSENTERY MALARIA, if fever persists FEVER-MALARIA UNLIKELY, if fever persists MEASLES WITH EYE OR MOUTH COMPLICATIONS	2 days
PERSISTENT DIARRHOEA ACUTE EAR INFECTION CHRONIC EAR INFECTION FEEDING PROBLEM ANY OTHER ILLNESS, if not improving	5 days
PALLOR	14 days
VERY LOW WEIGHT FOR AGE	30 days

NEXT WELL-CHILD VISIT

Advise mother when to return for next immunization according to immunization schedule.



WHEN TO RETURN IMMEDIATELY

Advise mother to return immediately if the child has any of these signs:	
Any sick child	• Not able to drink or breastfeed • Becomes sicker • Develops a fever
If child has NO PNEUMONIA: COUGH OR COLD, also return if:	• Fast breathing • Difficult breathing
If child has Diarrhoea, also return if:	• Blood in stool • Drinking poorly

▶ *Counsel the Mother About Her Own Health*

- If the mother is sick, provide care for her, or refer her for help.
- If she has a breast problem (such as engorgement, sore nipples, breast infection), provide care for her or refer her for help.
- Advise her to eat well to keep up her own strength and health.
- Check the mother's immunization status and give her tetanus toxoid if needed.
- Make sure she has access to:
  - Family planning
  - Counselling on STD and AIDS prevention

ASSESS, CLASSIFY AND TREAT THE SICK YOUNG INFANT AGE 1 WEEK UP TO 2 MONTHS

ASSESS

CLASSIFY

IDENTIFY TREATMENT

ASK THE MOTHER WHAT THE YOUNG INFANT'S PROBLEMS ARE

- Determine if this is an initial or follow-up visit for this problem.
  - If follow-up visit, use the follow-up instructions on the bottom of this chart.
  - If initial visit, assess the young infant as follows:

USE ALL BOXES THAT MATCH INFANT'S SYMPTOMS AND PROBLEMS TO CLASSIFY THE ILLNESS.

CHECK FOR POSSIBLE BACTERIAL INFECTION

ASK:

- Has the infant had convulsions?

LOOK, LISTEN, FEEL:

- Count the breaths in one minute. Repeat the count if elevated.
- Look for severe chest indrawing.
- Look for nasal flaring.
- Look and listen for grunting.

} YOUNG INFANT MUST BE CALM

- Look and feel for bulging fontanelle.
- Look for pus draining from the ear.
- Look at the umbilicus. Is it red or draining pus? Does the redness extend to the skin?
- Measure temperature (or feel for fever or low body temperature).
- Look for skin pustules. Are there many or severe pustules?
- See if the young infant is lethargic or unconscious.
- Look at the young infant's movements. Are they less than normal?

Classify ALL YOUNG INFANTS

SIGNS:	CLASSIFY AS:	TREATMENT: (Urgent pre-referral treatments are in bold print.)
• Convulsions or • Fast breathing (60 breaths per minute or more) or • Severe chest indrawing or • Nasal flaring or • Grunting or • Bulging fontanelle or • Pus draining from ear or • Umbilical redness extending to the skin or • Fever (37.5°C* or above or feels hot) or low body temperature (less than 35.5°C* or feels cold) or • Many or severe skin pustules or • Lethargic or unconscious or • Less than normal movement.	**POSSIBLE SERIOUS BACTERIAL INFECTION**	▶ ***Give first dose of intramuscular antibiotics.*** ▶ ***Treat to prevent low blood sugar.*** ▶ ***Advise mother how to keep the infant warm on the way to the hospital.*** ▶ ***Refer URGENTLY to hospital.*****
• Red umbilicus or draining pus or • Skin pustules.	**LOCAL BACTERIAL INFECTION**	▶ ***Give an appropriate oral antibiotic.*** ▶ Teach the mother to treat local infections at home. ▶ Advise mother to give home care for the young infant. ▶ Follow-up in 2 days.

THEN ASK:
Does the young infant have diarrhoea?

IF YES, ASK:	*LOOK AND FEEL:*
• For how long? • Is there blood in the stool?	• Look at the young infant's general condition. Is the infant: Lethargic or unconscious? Restless and irritable? • Look for sunken eyes. • Pinch the skin of the abdomen. Does it go back: Very slowly (longer than 2 seconds)? Slowly?

Classify DIARRHOEA

for DEHYDRATION	Two of the following signs: • Lethargic or unconscious • Sunken eyes • Skin pinch goes back very slowly.	**SEVERE DEHYDRATION**	▸ If infant does not have POSSIBLE SERIOUS BACTERIAL INFECTION: - Give fluid for severe dehydration (Plan C). OR ▸ ***If infant also has POSSIBLE SERIOUS BACTERIAL INFECTION:*** - ***Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way.*** ***Advise mother to continue breastfeeding.***
	Two of the following signs: • Restless, irritable • Sunken eyes • Skin pinch goes back slowly.	**SOME DEHYDRATION**	▸ Give fluid and food for some dehydration (Plan B). ▸ ***If infant also has POSSIBLE SERIOUS BACTERIAL INFECTION:*** - ***Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way.*** ***Advise mother to continue breastfeeding.***
	• Not enough signs to classify as some or severe dehydration.	**NO DEHYDRATION**	▸ Give fluids to treat diarrhoea at home (Plan A).
and if diarrhoea 14 days or more	• Diarrhoea lasting 14 days or more.	**SEVERE PERSISTENT DIARRHOEA**	▸ If the young infant is dehydrated, treat dehydration before referral unless the infant has also POSSIBLE SERIOUS BACTERIAL INFECTION. ▸ Refer to hospital.
and if blood in stool	• Blood in the stool.	**DYSENTERY**	▸ ***Treat for 5 days with an oral antibiotic recommended for Shigella in your area.*** ▸ Follow-up in 2 days.

* *These thresholds are based on axillary temperature. The thresholds for rectal temperature readings are approximately 0.5° C higher.*

** *If referral is not possible, see* ***Integrated Management of Childhood Illness****, Treat the Child, Annex: Where Referral Is Not Possible."*

THEN CHECK FOR FEEDING PROBLEM OR LOW WEIGHT:

ASK:

- Is there any difficulty feeding?
- Is the infant breastfed? If yes, how many times in 24 hours?
- Does the infant usually receive any other foods or drinks? If yes, how often?
- What do you use to feed the infant?

LOOK, LISTEN, FEEL:

- Determine weight for age.

IF AN INFANT: **Has any difficulty feeding,**
Is breastfeeding less than 8 times in 24 hours,
Is taking any other foods or drinks, or
Is low weight for age,

AND

Has no indications to refer urgently to hospital:

ASSESS BREASTFEEDING:

- Has the infant breastfed in the previous hour?

If the infant has not fed in the previous hour, ask the mother to put her infant to the breast. Observe the breastfeed for 4 minutes.

(If the infant was fed during the last hour, ask the mother if she can wait and tell you when the infant is willing to feed again.)

- Is the infant able to attach?
  no attachment at all *not well attached* *good attachment*

  TO CHECK ATTACHMENT, LOOK FOR:
  - Chin touching breast
  - Mouth wide open
  - Lower lip turned outward
  - More areola visible above than below the mouth

  (All of these signs should be present if the attachment is good.)

- Is the infant suckling effectively (that is, slow deep sucks, sometimes pausing)?
  not suckling at all *not suckling effectively* *suckling effectively*

  Clear a blocked nose if it interferes with breastfeeding.

- Look for ulcers or white patches in the mouth (thrush).

Classify FEEDING

• Not able to feed or • No attachment at all or • Not suckling at all.	**NOT ABLE TO FEED - POSSIBLE SERIOUS BACTERIAL INFECTION**	▸ ***Give first dose of intramuscular antibiotics.*** ▸ ***Treat to prevent low blood sugar.*** ▸ ***Advise the mother how to keep the young infant warm on the way to the hospital.*** ▸ ***Refer URGENTLY to hospital.***
• Not well attached to breast or • Not suckling effectively or • Less than 8 breastfeeds in 24 hours or • Receives other foods or drinks or • Low weight for age or • Thrush (ulcers or white patches in mouth).	**FEEDING PROBLEM OR LOW WEIGHT**	▸ Advise the mother to breastfeed as often and for as long as the infant wants, day and night. • If not well attached or not suckling effectively, teach correct positioning and attachment. • If breastfeeding less than 8 times in 24 hours, advise to increase frequency of feeding. ▸ If receiving other foods or drinks, counsel mother about breastfeeding more, reducing other foods or drinks, and using a cup. • If not breastfeeding at all: - Refer for breastfeeding counselling and possible relactation. - Advise about correctly prepare breastmilk substitutes and using a cup. ▸ If thrush, teach the mother to treat thrush at home. ▸ Advise mother to give home care for the young infant. ▸ Follow-up any feeding problem or thrush in 2 days. Follow-up low weight for age in 14 days.
• Not low weight for age and no other signs of inadequate feeding.	**NO FEEDING PROBLEM**	▸ Advise mother to give home care for the young infant. ▸ Praise the mother for feeding the infant well.

THEN CHECK THE YOUNG INFANT'S IMMUNIZATION STATUS:

IMMUNIZATION SCHEDULE:	AGE	VACCINE	
	Birth	BCG	OPV-0
	6 weeks	DPT-1	OPV-1

ASSESS OTHER PROBLEMS

TREAT THE YOUNG INFANT AND COUNSEL THE MOTHER

▶ *Give an Appropriate Oral Antibiotic*

For local bacterial infection:

First-line antibiotic: _____

Second-line antibiotic: _____

AGE or WEIGHT	COTRIMOXAZOLE trimethoprim + sulphamethoxazole ▶ Give 2 times daily for 5 days			AMOXYCILLIN ▶ Give 3 times daily for 5 days	
	Adult Tablet single strength (80 mg trimethoprim + 400 mg sulphamethoxazole)	Pediatric Tablet (20 mg trimethoprim +100 mg sulphamethoxazole)	Syrup (40 mg trimethoprim +200 mg sulphamethoxazole)	Tablet 250 mg	Syrup 125 mg in 5 ml
Birth up to 1 month (< 3 kg)		1/2*	1.25 ml*		1.25 ml
1 month up to 2 months (3-4 kg)	1/4	1	2.5 ml	1/4	2.5 ml

** Avoid cotrimoxazole in infants less than 1 month of age who are premature or jaundiced.*

For dysentery:

Give antibiotic recommended for Shigella in your area for 5 days.

First-line antibiotic for Shigella: _____

Second-line antibiotic for Shigella: _____

▶ *Give First Dose of Intramuscular Antibiotics*

▸ Give first dose of both benzylpenicillin and gentamicin intramuscular.

WEIGHT	GENTAMICIN Dose: 2.5 mg per kg		BENZYLPENICILLIN Dose: 50 000 units per kg	
	Undiluted 2 ml vial containing 20 mg = 2 ml at 10 mg/ml	OR Add 6 ml sterile water to 2 ml vial containing 80 mg* = 8 ml at 10 mg/ml	To a vial of 600 mg (1 000 000 units): Add 2.1 ml sterile water = 2.5 ml at 400 000 units/ml	OR Add 3.6 ml sterile water = 4.0 ml at 250 000 units/ml
1 kg	0.25 ml*		0.1 ml	0.2 ml
2 kg	0.50 ml*		0.2 ml	0.4 ml
3 kg	0.75 ml*		0.4 ml	0.6 ml
4 kg	1.00 ml*		0.5 ml	0.8 ml
5 kg	1.25 ml*		0.6 ml	1.0 ml

** Avoid using undiluted 40mg/ml gentamicin.*

▸ Referral is the best option for a young infant classified with POSSIBLE SERIOUS BACTERIAL INFECTION. If referral is not possible, give benzylpenicillin and gentamicin for at least 5 days. Give benzylpenicillin every 6 hours plus gentamicin every 8 hours. For infants in the first week of life, give gentamicin every 12 hours.

TREAT THE YOUNG INFANT AND COUNSEL THE MOTHER

▶ ***To Treat Diarrhoea, See TREAT THE CHILD* Chart.**

▶ ***Immunize Every Sick Young Infant, as Needed.***

▶ ***Teach the Mother to Treat Local Infections at Home***

- Explain how the treatment is given.
- Watch her as she does the first treatment in the clinic.
- Tell her to do the treatment twice daily. She should return to the clinic if the infection worsens.

To Treat Skin Pustules or Umbilical Infection

The mother should:

- Wash hands
- Gently wash off pus and crusts with soap and water
- Dry the area
- Paint with gentian violet
- Wash hands

To Treat Thrush (ulcers or white patches in mouth)

The mother should:

- Wash hands
- Wash mouth with clean soft cloth wrapped around the finger and wet with salt water
- Paint the mouth with half-strength gentian violet
- Wash hands

TREAT THE YOUNG INFANT AND COUNSEL THE MOTHER

▶ *Teach Correct Positioning and Attachment for Breastfeeding*

- Show the mother how to hold her infant
  - with the infant's head and body straight
  - facing her breast, with infant's nose opposite her nipple
  - with infant's body close to her body
  - supporting infant's whole body, not just neck and shoulders.
- Show her how to help the infant to attach. She should:
  - touch her infant's lips with her nipple
  - wait until her infant's mouth is opening wide
  - move her infant quickly onto her breast, aiming the infant's lower lip well below the nipple.
- Look for signs of good attachment and effective suckling. If the attachment or suckling is not good, try again.

▶ *Advise Mother to Give Home Care for the Young Infant*

- FOOD
  FLUIDS
  } Breastfeed frequently, as often and for as long as the infant wants, day and night, during sickness and health.
- WHEN TO RETURN

Follow-Up Visit

If the infant has:	Return for follow-up in:
LOCAL BACTERIAL INFECTION DYSENTERY ANY FEEDING PROBLEM THRUSH	2 days
LOW WEIGHT FOR AGE	14 days

When to Return Immediately:

Advise the mother to return immediately if the young infant has any of these signs:
Breastfeeding or drinking poorly Becomes sicker Develops a fever Fast breathing Difficult breathing Blood in stool

- MAKE SURE THE YOUNG INFANT STAYS WARM AT ALL TIMES.
  - In cool weather, cover the infant's head and feet and dress the infant with extra clothing.

GIVE FOLLOW-UP CARE FOR THE SICK YOUNG INFANT

▶ *LOCAL BACTERIAL INFECTION*

After 2 days:
Look at the umbilicus. Is it red or draining pus? Does redness extend to the skin?
Look at the skin pustules. Are there many or severe pustules?

Treatment:

- If ***pus or redness remains or is worse***, refer to hospital.
- If ***pus and redness are improved***, tell the mother to continue giving the 5 days of antibiotic and continue treating the local infection at home.

▶ *DYSENTERY*

After 2 days:
Assess the young infant for diarrhoea. > See "Does the Young Infant Have Diarrhoea?" above.
Ask:

- Are there fewer stools?
- Is there less blood in the stool?
- Is there less abdominal pain?
- Is the young infant eating better?
- Has fever developed?

Treatment:

- If the young infant is ***dehydrated***, treat dehydration.
- If ***number of stools, amount of blood in stools, abdominal pain, and eating are the same or worse, or fever develops***, refer to hospital. If fever, give first dose of intramuscular antibiotics before referral.
- If ***fewer stools, less blood in the stools, less abdominal pain, and eating better***, continue giving the same antibiotic until finished.

GIVE FOLLOW-UP CARE FOR THE SICK YOUNG INFANT

▶ *FEEDING PROBLEM*

After 2 days:
Reassess feeding. > See "Then Check for Feeding Problem or Low Weight" above.
Ask about any feeding problems found on the initial visit.

- Counsel the mother about any new or continuing feeding problems. If you counsel the mother to make significant changes in feeding, ask her to bring the young infant back again.
- If the young infant is low weight for age, ask the mother to return 14 days after the initial visit to measure the young infant's weight gain.

Exception:
If you do not think that feeding will improve, or if the young infant has ***lost weight***, refer the child.

▶ *LOW WEIGHT*

After 14 days:
Weigh the young infant and determine if the infant is still low weight for age.
Reassess feeding. > See "Then Check for Feeding Problem or Low Weight" above.

- If the infant is ***no longer low weight for age***, praise the mother and encourage her to continue.
- If the infant is ***still low weight for age, but is feeding well***, praise the mother. Ask her to have her infant weighed again within a month or when she returns for immunization.
- If the infant is ***still low weight for age and still has a feeding problem***, counsel the mother about the feeding problem. Ask the mother to return again in 14 days (or when she returns for immunization, if this is within 2 weeks). Continue to see the young infant every few weeks until the infant is feeding well and gaining weight regularly or is no longer low weight for age.

  Exception:
  If you do not think that feeding will improve, or if the young infant has ***lost weight***, refer to hospital.

▶ *THRUSH*

After 2 days:
Look for ulcers or white patches in the mouth (thrush).
Reassess feeding. > See "Then Check for Feeding Problem or Low Weight" above.

- If ***thrush is worse***, or if the infant has ***problems with attachment or suckling***, refer to hospital.
- If ***thrush is the same or better***, and if the infant is ***feeding well***, continue half-strength gentian violet for a total of 5 days.

MANAGEMENT OF THE SICK YOUNG INFANT AGE 1 WEEK UP TO 2 MONTHS

ame: _____ Age: _____ Weight: ___ kg Temperature: _____ °C

SK: What are the infant's problems? _____ Initial Visit? __ Follow-up Visit? __

SSESS (Circle all signs present) **CLASSIFY**

CHECK FOR POSSIBLE BACTERIAL INFECTION

- Has the infant had convulsions?
- Count the breaths in one minute. ____ breaths per minute
  Repeat if elevated ____ Fast breathing?
- Look for severe chest indrawing.
- Look for nasal flaring.
- Look and listen for grunting.
- Look and feel for bulging fontanelle.
- Look for pus draining from the ear.
- Look at the umbilicus. Is it red or draining pus?
  Does the redness extend to the skin?
- Fever (temperature 37.5°C or above feels hot) or low body temperature (below 35.5°C or feels cool)
- Look for skin pustules. Are there many or severe pustules?
- See if the young infant is lethargic or unconscious.
- Look at young infant's movements. Less than normal?

DOES THE YOUNG INFANT HAVE DIARRHOEA? Yes __ No __

- For how long? ____ Days
- Is there blood in the stool?
- Look at the young infant's general condition. Is the infant:
  Lethargic or unconscious?
  Restless and irritable?
- Look for sunken eyes.
- Pinch the skin of the abdomen. Does it go back:
  Very slowly (longer than 2 seconds)?
  Slowly?

THEN CHECK FOR FEEDING PROBLEM OR LOW WEIGHT

- Is there any difficulty feeding? Yes __ No __
- Is the infant breastfed? Yes __ No __
  If Yes, how many times in 24 hours? ____ times
- Does the infant usually receive any other foods or drinks? Yes — No —
  If Yes, how often?
- What do you use to feed the child?
- Determine weight for age. Low __ Not low __

If the infant has any difficulty feeding, is feeding less than 8 times in 24 hours, is taking any other food or drinks, or is low weight for age AND has no indications to refer urgently to hospital:

ASSESS BREASTFEEDING:

- Has the infant breastfed in the in the previous hour?

If infant has not fed in the previous hour, ask the mother to put her infant to the breast. Observe the breastfeed for 4 minutes.

- Is the infant able to attach? To check attachment, look for:
  - Chin touching breast Yes __ No __
  - Mouth wide open Yes __ No __
  - Lower lip turned outward Yes __ No __
  - More areola above than below the mouth Yes __ No __
- - *no attachment at all* *not well attached* *good attachment*
- Is the infant suckling effectively (that is, slow deep sucks, sometimes pausing)?

not suckling at all *not suckling effectively* *suckling effectively*

- Look for ulcers or white patches in the mouth (thrush).

CHECK THE YOUNG INFANT'S IMMUNIZATION STATUS Circle immunizations needed today

BCG DPT 1

OPV 0 OPV 1

Return for next immunization on:

_____
(Date)

ASSESS OTHER PROBLEMS:

TREAT

Return for follow-up in: _____

Give any immunizations needed today: _____

MANAGEMENT OF THE SICK CHILD AGE 2 MONTHS UP TO 5 YEARS

Name: _____ Age: _____ Weight: ___ kg Temperature: _____ °C

ASK: What are the child's problems? _____ Initial Visit? __ Follow-up Visit? __

ASSESS (Circle all signs present)

CLASSIFY

CHECK FOR GENERAL DANGER SIGNS NOT ABLE TO DRINK OR BREASTFEED VOMITS EVERYTHING CONVULSIONS LETHARGIC OR UNCONSCIOUS	General danger sign present? Yes __ No __ **Remember to use danger sign when selecting classifications**
DOES THE CHILD HAVE COUGH OR DIFFICULT BREATHING? Yes __ No __ • For how long? ____ Days • Count the breaths in one minute. ____ breaths per minute. Fast breathing? • Look for chest indrawing. • Look and listen for stridor.	
DOES THE CHILD HAVE DIARRHOEA? Yes __ No __ • For how long? ____ Days • Is there blood in the stool? • Look at the child's general condition. Is the child: Lethargic or unconscious? Restless and irritable? • Look for sunken eyes. • Offer the child fluid. Is the child: Not able to drink or drinking poorly? Drinking eagerly, thirsty? • Pinch the skin of the abdomen. Does it go back: Very slowly (longer than 2 seconds)? Slowly?	
DOES THE CHILD HAVE FEVER? (by history/feels hot/temperature 37.5°C or above) Yes __ No __ Decide Malaria Risk: High Low • For how long? ____ Days • If more than 7 days, has fever been present every day? • Has child had measles within the last 3 months? • Look or feel for stiff neck. • Look for runny nose Look for signs of MEASLES: • Generalized rash and • One of these: cough, runny nose, or red eyes.	
If the child has measles now or within the last 3 months: • Look for mouth ulcers. If Yes, are they deep and extensive? • Look for pus draining from the eye. • Look for clouding of the cornea.	
DOES THE CHILD HAVE AN EAR PROBLEM? Yes __ No __ • Is there ear pain? • Is there ear discharge? If Yes, for how long? ____ Days • Look for pus draining from the ear. • Feel for tender swelling behind the ear.	
THEN CHECK FOR MALNUTRITION AND ANAEMIA • Look for visible severe wasting. • Look for palmar pallor. Severe palmar pallor? Some palmar pallor? • Look for oedema of both feet. • Determine weight for age. Very Low ____ Not Very Low ____	
CHECK THE CHILD'S IMMUNIZATION STATUS Circle immunizations needed today BCG DPT 1 DPT 2 DPT 3 OPV 0 OPV 1 OPV 2 OPV 3 Measles	Return for next immunization on: _____ (Date)
ASSESS CHILD'S FEEDING if child has ANAEMIA OR VERY LOW WEIGHT or is less than 2 years old. • Do you breastfeed your child? Yes __ No __ If Yes, how many times in 24 hours? ____ times. Do you breastfeed during the night? Yes __ No __ • Does the child take any other food or fluids? Yes __ No __ If Yes, what food or fluids? _____ How many times per day? __ times. What do you use to feed the child? _____ If very low weight for age: How large are servings? _____ Does the child receive his own serving? __ Who feeds the child and how? _____ • During this illness, has the child's feeding changed? Yes __ No __ If Yes, how?	

ASSESS OTHER PROBLEMS:

TREAT

Remember to refer any child who has a danger sign and no other severe classification.

Return for follow-up in: _____

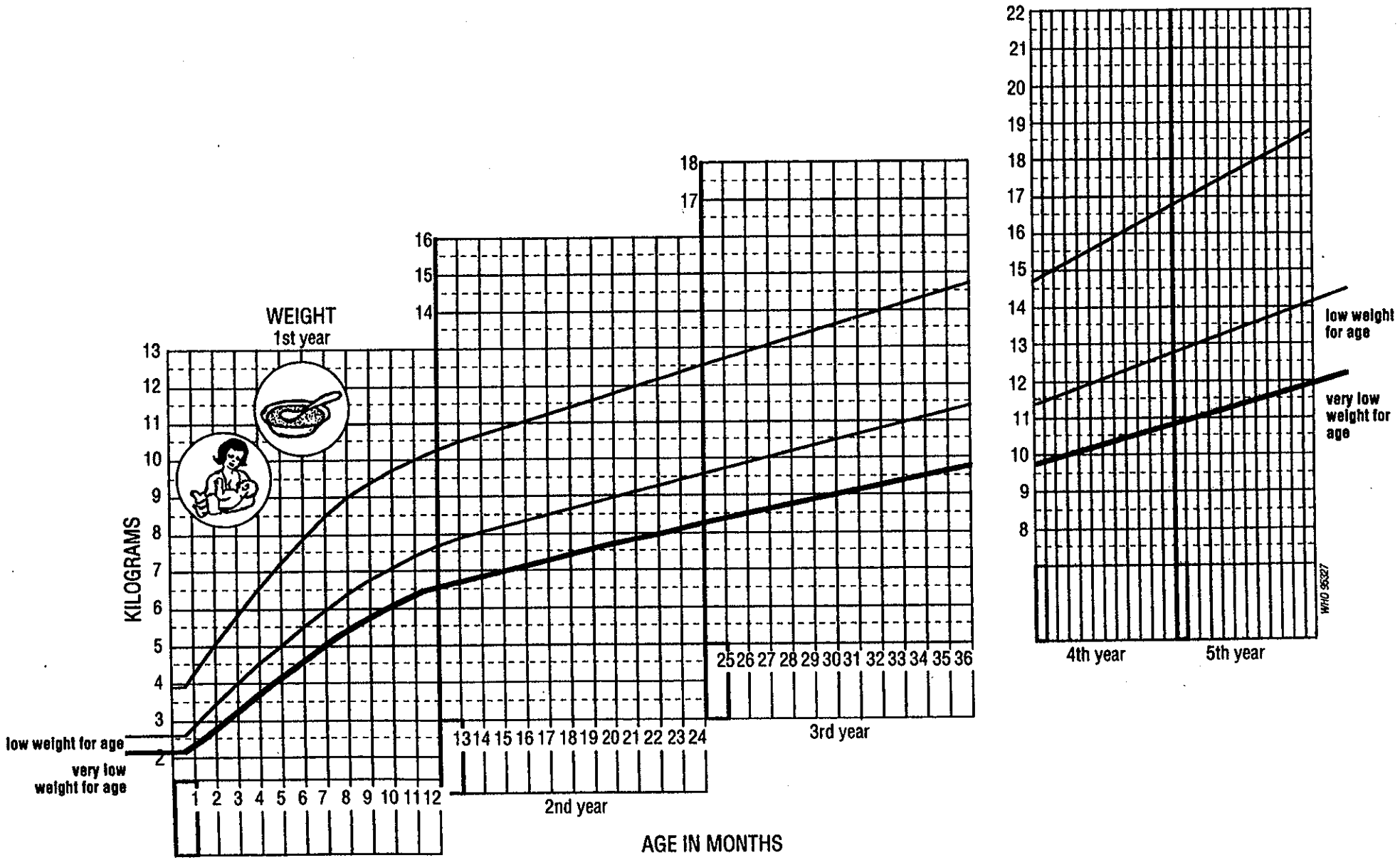
Advise mother when to return immediately.

Give any immunizations needed today: _____

Feeding advice: _____

NOTES

WEIGHT FOR AGE CHART



ANNEX 2. DMCI INDICATORS

DMCI INDICATORS

Indicators Description Format

This section presents detailed descriptions for each DMCI indicator. Each description follows exactly the same format, which is summarized below.

Indicator data can be collected at four different levels of the health care system. Each indicator in the descriptions that follow is coded according to the level at which it is measured, with the code appearing in parentheses after the indicator title. The health system level codes used are:

- **C** Central level: under direct supervision of the central government
- **R** Regional or district level: acts as the intermediary; provides supplies to the health facilities and not directly to patients
- **F** Health facility level: provides direct care to the patient population
- **D** Drug retail outlet level: usually serves as the patient's primary private sector source for drugs

Indicator Name: The name of the indicator, along with the different system levels that may be examined (for example, **C/R/F** signals that the indicator may be applied at the central, regional, and health facility levels).

Rationale: The reason that the indicator is important.

Definition: The meaning of the indicator and the terms used to describe the indicator.

Data Collection: The most likely source(s) of information is summarized in a table indicating *where* the data are to be collected, *whom* to ask for assistance, and *what* documents and records to review.

Brief discussions of methods and issues related to data collection.

Citations of the data collection forms to be used, if any.

Computation & Example: Computations, if any are needed, are accompanied by an example using illustrative data.

Presentation: Brief example of how results may be presented.

Notes: Suggestions for additional information or discussion required to put the indicator in proper context or to provide more detail.

Drug Availability Study Indicators

An accurate and systematic assessment of the logistics supply system is a prerequisite for planning improvements to the IMCI drug supply system. Worldwide, a problem that frequently recurs with new health initiatives is the failure to ensure drug supplies before training and other implementation activities take place. Failure to solve this problem is a major factor in low facility utilization rates and high dropout rates for community volunteer programs.

The most important methods for collecting information for this study are likely to be document review, key informant interviews, and physical inventory checks. Data collection sites will include MOH central offices, central and regional medical stores, and health facilities. The findings of the study will be useful to identify specific problems in the system, plan corrective interventions, monitor progress, and compare the performance of one system with another.

1. Percentage of DMCI tracer drug products on the national drug formulary (NDF)/ essential drugs list (EDL) (C)

Rationale: The WHO IMCI model treatment guidelines have been used to develop a standard list of drugs that should be available locally to treat the most common childhood illnesses. The WHO guidelines also include information on first- and second-line treatments. For the purposes of this assessment, the sample list of DMCI tracer drug is limited primarily to first-line treatments. This indicator is a measure of the ability of the system to support IMCI. If selection is the basis for procurement, inclusion on the NDF or EDL will help ensure availability.

Definition: The term NDF refers to a listing of all the unique drug products approved for medical practice in MOH facilities in a particular country. Sometimes the NDF will appear in a manual that contains a description for each product on the list. In countries where the MOH uses the term "National essential drug list," this is often the equivalent of an NDF. Sometimes, however, the term "essential drugs list" refers only to a list of products authorized for use in primary health care facilities. It is important, therefore, to understand how the terms related to essential drug lists are used before assuming that they meet the test of being equivalent to an NDF.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
MOH	Director of Pharmaceutical and/or Medical Supplies Services	NDF and/or EDL
Central Medical Stores	Officer in Charge/ Director/Manager	

Determine whether a NDF/EDL exists. If so, study investigators must obtain copies to assess the number of DMCI tracer drug products it contains. To make an accurate assessment, it is necessary to specify criteria for counting products containing the same active ingredient(s). This indicator is based on the list, developed by study organizers, of DMCI tracer drug used to treat common childhood health problems (see Chapter 2, Preparing the List of DMCI Tracer Drugs).

Products that are counted as the *same* item include:

- ? Brand name products that are chemically equivalent to generic products of the same strength and dosage form appearing on the list. For example, Bactrim 200/40 mg tablets and co-trimoxazole 200/40 mg tablets are counted as the same product.
- ? Tablets and capsules of the same product appearing in the same strength. For example, ampicillin 250 mg tablets and ampicillin 250 mg capsules are counted as one product.
- ? Fixed combination drug products, no matter how many chemicals they contain. For example, a combination product such as co-trimoxazole, containing trimethoprim and sulfamethoxazole, is counted as one drug product.

Products that are counted as *different* items include:

- ? Different strengths of the same chemical entity. For example, co-trimoxazole 100/20 mg tablets and co-trimoxazole syrup 200/40 mg/5 ml are counted as two products.
- ? Dosage forms for different routes of administration. For example, tablets and capsules (oral), suppositories (rectal), and injectables (IM/IV/SC) should each be counted as different drug products for a particular drug.
- ? Different dosage forms for the same route of administration, such as tablets and suspensions. For example, amoxicillin 250 mg tablets and amoxicillin 25 mg/ml suspension are counted as two different drug products.

Computation & Example: The indicator is recorded as the percentage of DMCI tracer drug products on the NDF or EDL. Record the year of the most recent edition of the published NDF. If no NDF exists, this indicator would be recorded as *none*.

$$\text{\% of DMCI Tracer Drugs on the NDF} = \frac{\text{Number of DMCI Tracer Drugs on NDF}}{\text{Total Number of DMCI Tracer Drugs}} \times 100$$

$$\text{\% of DMCI Tracer Drugs on the NDF} = \frac{20}{30} \times 100 = 66.7\%$$

Presentation: Country A has a national drug formulary with a total of 230 unique drug products listed. It was revised in 1993. There is also an essential drugs list for primary health care facilities with 20 of the 30, or 66.7%, of DMCI tracer drug products listed.

2. Percentage of median international price paid for a set of DMCI tracer drugs that was part of the last regular MOH procurement (C/R/F)

Rationale: This indicator will help determine the potential savings to the MOH that could be achieved if procurement practices are improved. Possible savings would support changes in the pharmaceutical supply system.

Definition: Median international price is the median free on board (FOB) price from a set of international suppliers, adjusted to reflect estimated cost, insurance, and freight (CIF) prices. One source of price information is the MSH *International Drug Price Indicator Guide.* The last regular procurement price refers to the CIF price paid during the last regular MOH procurement.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
MOH-Procurement Unit	Officer in charge of pharmaceutical purchases	List of most recent prices paid for a set of DMCI tracer drugs
Central Medical Stores	Manager or Reception Officer	
Regional government administration or Medical Store	Manager	
Health facilities	Pharmacist or Procurement Officer	Tender documents, supplier invoices

This indicator is based on the list, developed by study organizers, of DMCI tracer drugs used to treat common childhood health problems (see Chapter 2, Preparing the List of DMCI Tracer Drugs). Information on CIF prices paid by the MOH for the tracer drugs should apply to the last regular procurement. Any more recent *ad hoc* or emergency procurements that may have taken place should be compared separately with international prices. The median international prices for the tracer drugs may be determined by reference to the international unit prices in the MSH *International Drug Price Indicator Guide*. Do not use the average cost listed in the Guide. Instead, use the median price for each tracer drug.

The *median* (or middle-most) is used instead of the *mean* (or average) retail price to avoid bias caused by outlying high or low prices for a given drug product. To determine the median retail price for each product, examine the complete list of 20 prices obtained from all sites, arranged in ascending order, and pick the middle two numbers (the **10th** and **11th**). Add these two numbers and divide by two to obtain the median. If the list contains an odd number of items, simply select the middle-most number as the median. See the following examples:

Ex. 2,3,4,5,6 Median is **4**

Ex. 2,3,4,5,6,7 Median: 4 + 5 = 9 ÷ 2 = **4.5**

The prices in the *International Drug Price Indicator Guide* are FOB and should be adjusted upward by 20% to reflect average shipping and insurance costs. Specify the source of international prices and the year of both data sets. If all purchases are not done by one central agency, compile information separately by type of institution, and compute the percentage of international price for each type of purchasing institution (e.g., Regional Medical Stores, hospitals, health centers, etc.). Note the date of the most recent regular drug procurement. When making calculations, it may be necessary to convert prices paid in local currencies into U.S. dollars. **It is important to use the exchange rates in effect at the time the purchases were made, and to use the edition of the *Price Guide* that corresponds with the year in which purchases were made.**

See DAS-5: International Price Comparison Form in Annex 5.

Computation & Example: The indicator should be presented as the percentages of median international prices for the set of DMCI tracer drugs. If data are collected from different levels of the system, a separate average should be calculated for each level. The computation involves two steps:

? First, the percentages are calculated for each of the DMCI tracer drugs by dividing the purchase cost of the *comparison unit* (e.g., tablet, milliliter, etc.) at the last regular MOH procurement by the median international price of that unit and multiplying the result by 100.

$$\text{\% of Median International Price} = \frac{\text{Comparison Unit Price}}{\text{Median International Unit Price}} \times 100$$

? Second, the average percentage for all DMCI tracer drugs is calculated by summing their percentages and dividing by the total number on the list.

$$\text{Average \% of All DMCI Tracer Drug} = \frac{\text{Sum of Percentages of All DMCI Tracer Drugs}}{\text{Total Number of DMCI Tracer Drugs}}$$

For purposes of illustrating the computation of the result at the Central Medical Stores (CMS), assume an indicator list of three products:

Product	Comparison Unit Price	Adjusted Median International Unit Price*
Co-trimoxazole 20/100 mg tab.	0.0207/tab.	0.0163/tab.
ORS 200 ml pkt.	0.0677/pkt.	0.0578/pkt.
Paracetamol Syrup 24 mg/ml	0.0070/ml	0.0051/ml

*The figures in this column have been adjusted to reflect estimated CIF prices.

1. The first step is to calculate the percentage for each product.

For co-trimoxazole, the first product on the list, this is done as follows:

$$\text{\% of Median International Price} = \frac{0.0207}{0.0163} \times 100 = 127\%$$

Using the data in the table, the percentages for ORS and paracetamol are calculated as 117% and 137%, respectively.

2. Next, the average percentage for all three products is calculated as follows:

$$\text{Average \% of All DMCI Tracer Drugs} = \frac{127 + 117 + 137}{3} = 127\%$$

Presentation: In country C, comparisons of drug purchase prices with median international prices were made at both the CMS and at a sample of one national and three regional hospitals. In 1992 the CMS paid an average of 127% of the median international price, while the hospitals paid 206% for the set of tracer drugs.

3. Average percentage of a set of unexpired DMCI tracer drugs available in MOH storage and health facilities (C/R/F)

Rationale: The successful implementation of the IMCI strategy is dependent on the drugs being available. If they are not, children may not receive proper treatment.

Definition: A drug is defined as available if even one unit of unexpired product is in stock. Since expired drugs are inappropriate for use in almost all situations, they are not counted as stock available for use.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
Central Medical Stores	Inventory Officer/Storekeeper	Inventory records and stock count for DMCI tracer drugs
Regional Medical Stores	Manager/Storekeeper	
20 MOH health facilities	Dispenser/Pharmacist/Storekeeper	

This indicator is based on the list, developed by study organizers, of DMCI tracer drugs used to treat common childhood health problems (see Chapter 2, Preparing the List of DMCI Tracer Drugs). First, in consultation with staff at the CMS, the Regional Medical Stores (RMS), and local health facilities, determine which of these products are normally stocked at each level. The figure for drugs *normally stocked* becomes the denominator in calculations. Then, determine whether each of the normally stocked drugs is available. If any of each of the DMCI tracer drugs is unexpired and available, record that item as "present" even if it is likely to be out of stock very soon. If all stock for a product on the list is expired, record 0. Do not worry about stock levels for this indicator.

See DAS-2: Inventory Data Form in the *Data Collector's Guide*.

Computation & Example: This indicator is recorded as a percentage, calculated by dividing the number of unexpired DMCI products found in stock by the total number of products for which availability was assessed, and multiplying by 100.

$$\text{\% of DMCI Tracer Drugs Availability} = \frac{\text{Number of Unexpired DMCI Tracer Drugs in Stock}}{\text{Total Number of Tracer Drugs Normally Stocked}} \times 100$$

Present the data in separate tables for each type of facility (CMS, RMS, and peripheral health facilities) visited. For the sample of health facilities, the indicator is calculated as the average of the facility-specific averages:

$$\text{Average \% of DMCI Tracer Drug Availability} = \frac{\text{Sum of Average \% for Each Facility}}{\text{Total Number of Facilities in Sample}}$$

To calculate the average percentage of DMCI tracer drug availability for the sample of health facilities, carry out the following steps:

1. For one health facility with 11 unexpired DMCI tracer drugs in stock, from a list of 19 tracer drugs normally stocked, the calculation is:

$$\text{\% of DMCI Tracer Drug Availability} = \frac{11}{19} \times 100 = 58\%$$

2. For a sample of 20 health facilities, for which the sum of percentages of tracer drugs in stock is 960%, the average percentage of tracer drugs in stock is calculated as:

$$\text{Average \% of DMCI Tracer Drug Availability} = \frac{960\%}{20} = 48\%$$

Presentation: In a survey of 20 health facilities, where 19 DMCI indicator products were confirmed to be normally stocked, an average of 48% of the listed products was found in stock. The range among facilities was 25% to 85%, with the lower end of the range being associated with more peripheral health facilities. The facility-specific averages are listed below:

- Regional medical stores—85%
- District hospitals—64%
- Health centers and posts—48%

4. Average percentage of time out of stock for a set of DMCI tracer drugs in MOH storage and health facilities (C/R/F)

Rationale: The percentage of time out of stock for a set of DMCI tracer drugs gives a measure of a procurement and distribution system's capacity to maintain a constant supply of drugs. The successful implementation of the IMCI strategy is dependent on the drugs being available.

Definition: Time out of stock, or stock-out time, is defined as the number of days that a product was not present in a warehouse or health facility over a recent 12-month period (usually the 12 months preceding the one during which the assessment takes place). To be considered a stock-out, there must have been none of an unexpired drug in stock. If even small quantities of an unexpired drug were present, the drug should be counted as in stock. Percentage of time out of stock is defined as the percentage of days during a 12-month period that a drug has been out of stock (based on inventory records).

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
Central Medical Stores	Inventory Officer/ Storekeeper	Drugs that are normally stocked from the list of tracer drugs and number of days these normally stocked drugs were out of stock during the 12 months prior to assessment or during previous year
Regional Medical Stores	Manager	
20 MOH health facilities	Dispenser/Pharmacist/ Storekeeper	

This indicator is based on the list, developed by study organizers, of DMCI tracer drugs used to treat common childhood health problems (see Chapter 2, Preparing the List of DMCI Tracer Drugs). In order to determine stock-out duration, it is necessary that there be a reasonably accurate inventory recording system (computer, ledger, bin cards, etc.) in place. As in the previous indicator, the first step is to consult with staff at each facility and determine which of the products are normally stocked. It is the number of drugs *normally stocked* that will be used in calculations. To determine average stock-out duration, identify which of the normally stocked drugs were out of stock during the last year, and then determine for how many days the product was out of stock during that time. Ideally, this should be determined for the 12 months prior to the month in which the visit occurs. The critical issue is that the same 12-month period should be used for all health facilities and warehouses visited.

See DAS-3: Stock-Out Data Form in the *Data Collector's Guide*.

Computation & Example: Enter the historical stock data into a table, recording the names of the DMCI tracer drugs and the number of days of stock-out in the previous year. To compute this indicator, carry out the following steps:

? First, for each DMCI tracer drug in the table, record the number of days out of stock for each of the last 12 months. Then sum the total numbers of days out of stock over the past 12 months for all drugs.

? Second, to record this indicator, compute the *average percentage of time that all DMCI tracer drugs were out of stock*, within the 12 month period, by adding all the stock-out days for all drugs, dividing by 365 times the number of drugs, and multiplying by 100.

Average % of Time That DMCI Tracer Drugs Were Out of Stock =

$$\frac{\text{Total Number of Stock-out Days for All DMCI Tracer Drugs}}{365 \times \text{Total Number of DMCI Tracer Drugs Normally Stocked}} \times 100$$

Present this data in tables, and report averages for each type of facility visited (CMS, RMS, and peripheral health facilities).

For purposes of illustrating the computation, assume a DMCI tracer drug list of three products:

Product	Total Days Out of Stock
Co-trimoxazole 20/100 mg tab.	36
ORS 200 ml pkt.	64
Paracetamol 24 mg/ml 100 ml bot.	123

Assume that in a CMS all three of these tracer drugs are normally stocked.

Average % of Time That DMCI Tracer Drugs Were Out of Stock =

$$\frac{36 + 64 + 123}{365 \times 3} \times 100 = 20\%$$

Presentation: In country C, over a 12-month period, the DMCI tracer drugs were out of stock an average of 20% of the time at the Central Medical Stores. In the Regional Medical Stores, the tracer drugs were out of stock an average of 30% of the time. In the sample of health clinics, the DMCI tracer drugs were out of stock an average of 40% of the time.

5. Average percentage of stock records that correspond with physical counts for a set of DMCI tracer drugs in MOH storage and health facilities (C/R/F)

Rationale: The average percentage of stock records that correspond with physical counts is a measure of the quality of the stock record keeping system. This indicator will help to gain control over inventory, identify problems such as wastage or pilferage, and highlight problems of poor record keeping, all of which contribute to financial losses.

Definition: This is the average percentage of in-stock DMCI tracer drug inventory records that correspond exactly with physical stock count for a set of DMCI tracer drugs.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
Central Medical Stores	Inventory Officer/ Storekeeper	Most accurate records of current stock levels for each DMCI tracer drug, issues and receipts not entered, method of recording stocks, physical count of unexpired stock levels
Regional Medical Stores	Manager	
20 MOH health facilities	Dispenser/Pharmacist/ Storekeeper	

This indicator is based on the list, developed by study organizers, of DMCI tracer drugs used to treat common childhood health problems (see Chapter 2, Preparing the List of DMCI Tracer Drugs).

Visit the CMS, at least one regional store if they exist in this system, and a sample of 20 health facilities. At each site, carry out the following procedure:

- Ask staff to produce the most accurate records of current stock level for each of the DMCI tracer drugs. Ask them to produce their records for any recent issues or receipts that have not been entered in their stock level records.
- Take note of the means used to produce these estimates (computerized system, manual ledgers, bin cards). If bin cards exist, and if they were not used to produce the best estimates, obtain a second set of data based on bin cards.
- Finally, carry out a physical count of the unexpired stock levels for these drugs, and record the number of units for each DMCI tracer drug in stock. The expired units should not be counted. Tracer drugs that are not normally stocked by the facility should be excluded.

See DAS-2: Inventory Data Form in the *Data Collector's Guide*.

Computation & Example: For the set of tracer drugs, calculate the percentage of records checked that correspond exactly with the physical counts according to the tally and the ledger. To do this, divide the number of records for which no discrepancy was found by the total number of records checked, and multiply this result by 100.

% of Stock Records Corresponding with Physical Counts =

$$\frac{\text{Number of Stock Records with No Discrepancies}}{\text{Total Number of Records Examined}} \times 100$$

Present the data in separate tables for each type of facility in the sample (CMS, RMS, or peripheral health facilities). For the sample of health facilities, the indicator is calculated as the average of the facility-specific averages:

$$\text{Average \% of Stock Records Corresponding with Physical Counts} = \frac{\text{Sum of Average \% for Each Facility}}{\text{Total Number of Facilities in Sample}}$$

For purposes of illustrating this computation, assume a DMCI tracer drug list of three products:

Product	Record	Count
Co-trimoxazole 20/100 mg tab.	10,000	10,000
ORS 200 ml pkt.	1,000	990
Paracetamol 24 mg/ml 100 ml bot	88	87

To calculate the percentage of stock records that correspond exactly with physical counts, carry out the following steps:

For one health facility, using the DMCI tracer drug list above:

1. The number of records examined = 3

2. The number of records with no discrepancy = 1

$$\text{\% of Stock Records Corresponding with Physical Stock Counts} = \frac{1}{3} \times 100 = 33\%$$

For a sample of 20 health facilities, for which the sum of percentages of stock records that correspond exactly with physical counts is 600%, the average percentage of DMCI tracer drugs that correspond exactly with physical counts is calculated as:

$$\text{Average \% of Stock Records Corresponding with Physical Counts} = \frac{600\%}{20} = 30\%$$

Presentation: After adjusting for issue tickets not yet entered in the records at the Central Medical Stores in country Q, the percentage of records for three DMCI tracer drugs that corresponded exactly with physical counts was 33%. The average percentage of health facility records that corresponded exactly with physical counts was 30%, with the range among facilities from 10% to 60%.

6. Percentage of MOH storage and health facilities visited that have a working refrigerator with freezing compartment and thermometer for vaccine storage (C/R/F)

Rationale: Vaccines aid in protecting children from preventable diseases and must be administered during the first three years of life. Refrigerators with freezing compartments and thermometers are essential to ensure an effective cold chain system.[7]

Definition: To qualify as a working refrigerator the appliance must have a functioning main refrigerator area, freezing compartment, and thermometer, and be able to cool the vaccines to between 2ºC and 8ºC. The freezer temperature should be below 0ºC at the time of the inspection.[8] Furthermore, appropriate storage conditions should be in accordance with WHO and national EPI policies. Please consult with your national EPI coordinator for local definitions.

This indicator is measuring whether each health facility has at least one working refrigerator for vaccines, therefore, any health facility with more than one refrigerator will be judged by the refrigerator used for vaccines. If more than one is used to store vaccines, then information about each of the refrigerators should be noted by the data collector, and the facility judged by whether it has at least one working refrigerator.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
Central Medical Stores	Inventory Officer/Storekeeper	Inspect the condition of the refrigerators in each of these facilities. Check if it is working and has a freezing compartment and a thermometer.
Regional Medical Stores	Manager/Storekeeper	Inspect the condition of the refrigerators in each of these facilities. Check if it is working and has a freezing compartment and a thermometer.
20 MOH health facilities	Dispenser/Pharmacist/ Storekeeper	Inspect the condition of the refrigerators in each of these facilities. Check if it is working and has a freezing compartment and a thermometer.

[7]Management Sciences for Health. *Managing Drug Supply*. West Hartford, Conn.: Kumarian Press, 1997, p. 349.

[8]James E. F. Reynolds, ed., *MARTINDALE: The Extra Pharmacopoeia*. Thirteenth Edition (London: The Pharmaceutical Press, 1993).

Monitoring the storage of the polio, measles, and DPT vaccines that are on the list developed by study organizers of DMCI tracer drug used to treat common childhood health problems (see Chapter 2, Preparing a List of DMCI Tracer Drugs) can help to determine whether the refrigeration and/or cold chain systems are adequate. The oral polio vaccine is the only vaccine that is currently packaged with vaccine vial monitors (VVM). These VVMs indicate whether heat exposure exceeded the temperature limits on use. Random spot checks of the VVMs can be useful in determining whether the cold chain system is functioning.

Also, by spot-checking DPT vaccines, it is possible to verify whether vaccines have been damaged by freezing. DPT rapidly forms a dense precipitate when thoroughly shaken. The precipitate contains floccule or granular particles if it has been frozen. If the DPT vaccine has not been damaged by freezing, the vaccine will look cloudy and smooth after 15 minutes. If it has been frozen, the vaccine will have sediment settling on the bottom of the vial. After 30 minutes the DPT vaccine should either be clear, indicating that the vaccine is fine for use, or be almost clear with a dense sediment, indicating that it has been frozen. Frozen vaccines indicate a break in maintaining adequate storage temperatures and should not be used.

To determine whether the refrigerator is in working condition, the data collector should physically inspect the appliance. The data collector should note the capacity, physical condition, and features of the appliance such as freezer and thermometer. If more than one refrigerator is used to store vaccines, then the facility will be judged by whether it has at least one working refrigerator.

This data can also be obtained from question 20 in Assessment Instrument 4 (Equipment and Supplies Checklist) in the BASICS *Integrated Health Facility Assessment Manual*.[9] The question addresses the type and condition of the refrigerator. The question also addresses whether the refrigerator has a freeze-watch indicator and thermometer inside. For this indicator, the health facility would be considered to have a working refrigerator if the BASICS survey showed the following responses: (1) the condition of the refrigerator was either Fair or Good; (2) the refrigerator had both a freeze-watch indicator and a thermometer inside; and (3) the temperature at the time of inspection was between 2ºC and 8ºC. If any of these conditions are not met, then the health facility would not be considered to have a working refrigerator.

See DAS-2: Inventory Data Form in the *Data Collector's Guide*.

[9]John Murray and Serge Manoncourt. 1998. *Integrated Health Facility Assessment Manual: Using Local Planning to Improve the Quality of Child Care at Health Facilities.* Published for the U.S. Agency for International Development by the Basic Support for Institutionalizing Child Survival (BASICS) Project. Arlington, Va.

Computation & Example: This indicator is a percentage. It is computed by dividing the total number of health facilities with at least one working refrigerator by the number of facilities visited and multiplying by 100, to convert the decimal to a percentage.

$$\text{\% of Health Facilities with a Working Refrigerator} = \frac{\text{Total \# of Health Facilities with a Working Refrigerator}}{\text{Total \# of Health Facilities}} \times 100$$

For example, in country Z, 20 health facilities' refrigerators were inspected. Two health facilities had newly donated refrigerators that seemed to cool the vaccines well but did not have a thermometer system in the refrigerator, and therefore did not meet the working refrigerator criteria. Fourteen health facilities had refrigerators that were old, but they had thermometers and freezing compartments and were registering adequate temperatures during the visit. Therefore, they met the working refrigerator criteria. Two facilities' refrigerators were under repair and one health facility did not have any refrigeration system; therefore, these did not meet the working refrigerator criteria. Finally, one facility had two refrigerators that had thermometers, freezers, and adequate cooling, and therefore met the criteria of having at least one working refrigerator.

$$\text{\% of Health Facilities with a Working Refrigerator} = \frac{14+1}{20} = \frac{15}{20} \times 100 = 75\%$$

Presentation: In country Z, in a survey of 20 health facilities, 75% had at least one working refrigerator per health facility.

7. Percentage of MOH storage and health facilities with up-to-date refrigerator temperature monitoring records (C/R/F)

Rationale: This indicator is used to determine the efficiency of monitoring. Vaccines that are stored at improper temperatures at any point in their transport to the health facilities or in the facilities themselves may be damaged and no longer efficacious. To ensure that vaccines are not compromised, it is important to establish a system to monitor the storage temperature of vaccines. Such a system would permit identification of any breakdown in the system and enable repair before damage of vaccines occurs.

Definition: Temperatures of all refrigerators where vaccines are stored must have been recorded daily for the past thirty days up to the day of the site visit in order to meet the criteria for an up-to-date refrigerator temperature chart. A break in recording of more than one day (excluding weekends and holidays as interruptions) indicates that the health facility does not have an up-to-date temperature chart.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
Central Medical Stores	Inventory Officer/Storekeeper	Check whether a refrigerator temperature chart is in use in each of these facilities
Regional Medical Stores	Manager/Storekeeper	Check whether a refrigerator temperature chart is in use in each of these facilities
20 MOH health facilities	Dispenser/Pharmacist/ Storekeeper	Check whether a refrigerator temperature chart is in use in each of these facilities

Data collectors will look for an up-to-date temperature chart for each refrigerator used to store vaccines in health facilities. If the temperature was recorded daily for at least one month up to the day of the site visit, then the health facility will be considered to have an up-to-date chart. However, if during that time period the temperature was not recorded for more than one day, then the health facility will be considered as not having an up-to-date chart.

If more than one refrigerator is used for the storage of vaccines, the data collector must check that all refrigerators have an up-to-date temperature chart in use. For this indicator, if a health facility has more than one refrigerator for vaccines, then it will be considered to meet the criteria if a temperature chart is in use for at least one of the refrigerators used to store vaccines.

To collect this information, it will be necessary to inspect the records of the monitoring efforts over the past thirty days, up to the day of the site visit for each refrigerator used in each health facility. The data collector should note the frequency of temperature records and whether there were gaps in monitoring of over one day for the last thirty days. If such gaps occurred, the data collector should note the dates that temperatures were not recorded. This information will be useful in determining any pattern in the breakdown of monitoring efforts. Data for this indicator can be obtained from question 20 in Assessment Instrument 4 (Equipment and Supplies Checklist) in the *Integrated Health Facility Assessment Manual.*[10]

See DAS-2: Inventory Data Form in the *Data Collector's Guide*.

Computation & Example: This indicator is a percentage. It is computed by dividing the total number of health facilities with up-to-date refrigerator temperature charts for at least one refrigerator by the number of facilities visited and multiplying by 100, to convert the decimal to a percentage.

$$\text{\% of Health Facilities with Up-To-Date Charts} = \frac{\text{Total \# of Health Facilities with Up-To-Date Charts}}{\text{Total \# of Health Facilities}} \times 100$$

For example, in country P, 20 health facilities' refrigerator temperature charts were reviewed. Assessment of these 20 health facilities showed that up to the day of the site visit 2 had no temperature monitoring, 8 monitored temperature daily, 5 monitored temperature every other day and 5 monitored temperatures intermittently.

$$\text{\% of Health Facilities with Up-To-Date Temperature Monitoring} = \frac{8}{20} \times 100 = 40\%$$

Presentation: Of the 20 health facilities surveyed, only 40% had an up-to-date temperature chart for their refrigerators.

[10]John Murray and Serge Manoncourt. 1998. *Integrated Health Facility Assessment Manual: Using Local Planning to Improve the Quality of Child Care at Health Facilities.* Published for the U.S. Agency for International Development by the Basic Support for Institutionalizing Child Survival (BASICS) Project. Arlington, Va.

Drug Use Study Indicators

These indicators focus on drug use practices for treating selected childhood illnesses currently taking place in the health system. Most developing countries have adopted case management policies for various health problems based on WHO guidelines. However, despite years of promotion, health care providers frequently do not follow these guidelines when prescribing drugs. Whatever the intervention attempted in response to this problem, there are four needs that are constant: identifying the specific prescribing behaviors to change; intervening to bring about positive change; assessing the extent to which change takes place; and periodic monitoring of the status of problem behaviors.

Data collection for this study will involve a retrospective review of patient records in health facilities using standard data collection forms, copies of which are provided in the Data Collector's Guide. Retrospective data collection requires that adequate sources of data exist (i.e., records that offer a method of selecting a random sample of patient encounters that took place within a defined period of time and the specific names and routes of administration of all drugs prescribed).

To assess certain aspects of the interaction between health workers and caregivers, direct observation will be used. This will be followed by exit poll interviews of the caregivers to allow a comparison of what was told to the caregiver by the health worker and what information concerning drug treatment was actually understood or retained by the caregiver.

For the simulated purchases, data collectors posing as customers seeking help for treating a selected childhood illness will visit retail drug outlets (or health facility pharmacies). The data collector will present him or herself (without a prescription) as the caretaker of a child who has had, for example, numerous bowel movements for two days. The data collector will ask the drug seller for advice about what products are best to treat this condition. All information is recorded on information sheets by the data collector after leaving the store.

By using the indicators, the user will be able to develop a profile of current practices for treating selected childhood illnesses. The information gathered can be used as a basis for (1) identifying factors that influence particular behaviors and (2) designing interventions for bringing about improvements.

8. Percentage of MOH health facilities visited with an official manual of treatment guidelines for childhood illnesses, based on WHO IMCI treatment guidelines (F)

Rationale: This indicator is used to measure the level of access to information to promote effective care and management of sick children based on treatment guidelines adapted from WHO.

Definition: To qualify as an official manual or standard treatment guidelines (STGs) for the purposes of this indicator, a document must be intended as a clinical reference for health care providers who see and sometimes treat sick children, and it must present information on the treatment of the most common childhood illnesses for that particular country, including the examination, care and drug therapy, and follow-up of the sick child. This indicator measures the presence of the current edition of an official manual or STGs.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
MOH	Director of Health Services	Most recent copy of manual or STGs
20 MOH health facilities	Health Officer/Director/ Manager Facility Manager	Most recent copy of manual or STGs

Such a manual or STGs must officially exist for this indicator to be meaningful. If so, obtain the most recent copy of the manual or STGs that has been prepared to provide impartial information about how to care for a sick child with a common childhood illness. Evaluate whether the information in the manual or STGs meets all the following criteria, specified in the definition above:

? The document is intended as a clinical reference for health care providers.

? The document presents information on the examination, treatment (including drug therapy), and follow-up care for common childhood health problems.

Data for this indicator are collected by survey of a sample of 20 health facilities. At each site, staff are asked to produce a copy of a document that meets the above criteria.

See DUS-1: Medical Records Review Form in the *Data Collector's Guide*.

Computation & Example: This indicator is a percentage. It is computed as the number of facilities at which an official manual or STGs is found, divided by the total number of facilities in the sample and multiplying by 100, to convert the decimal to a percentage.

$$\text{\% Facilities with Official Manual or STGs} = \frac{\text{Number of Facilities with Official Manual or STGs}}{\text{Number of Facilities in Sample}} \times 100$$

$$\text{\% Facilities with Official Manual or STGs} = \frac{9}{20} \times 100 = 45\%$$

Presentation: In country Y, a national manual exists: it was adapted in 1996 from the WHO IMCI treatment guidelines. The manual is intended for use by physicians, nurses, and other health care personnel who treat children. It contains information on examination, care (including drug therapy), and follow-up services for children two months to five years old suffering from the five most common health problems in the country. An indicator study carried out in country Y revealed that in 45% of health facilities, or 9 health facilities out of a sample of 20 surveyed, staff could produce a copy of the 1996 edition of the manual.

9. Percentage of encounters diagnosed as no-pneumonia (cough or cold) that are prescribed antibiotics (F/D)

10. Percentage of encounters diagnosed as pneumonia that are prescribed appropriate antibiotics, according to treatment guidelines (F/D)

Rationale: These indicators attempt to measure the degree of adherence with IMCI treatment guidelines. They are listed here together because the two indicators represent the positive and negative outcome of the same area of prescribing practice, drug treatment for acute respiratory infection (ARI). For the purposes of this assessment study, ARI has been subdivided into "pneumonia" and "no-pneumonia (cough or cold)."

No-pneumonia (cough or cold) represents more common, self-limiting infections like the common cold, which are caused by viruses and thus should not be treated with antibiotics. Prescribing antibiotics for the common cold is a widely practiced inappropriate use of antibiotics. Using antibiotics when they are not needed is very costly, reduces availability for other more serious health problems, and contributes to antibiotic resistance.

In developing countries, bacteria causes most cases of pneumonia. These cases need treatment with antibiotics. However, antibiotics are costly therapies and are frequently overused. Antibiotic resistance to common infections has rendered some formerly useful drugs ineffective. This is partly caused by indiscriminate, empirical, and uninformed prescribing practices and other forms of overuse. This is especially serious when national capacity for laboratory monitoring of antimicrobial sensitivity is limited or nonexistent.

Definition: Appropriate antibiotics include those antibiotics listed in the IMCI guidelines for treatment of pneumonia. The WHO IMCI treatment guidelines list co-trimoxazole, amoxicillin, or chloramphenicol as appropriate antibiotics for treatment of pneumonia. If country-specific treatment guidelines exist, use these guidelines to determine the list of appropriate antibiotics. Other antibiotics and antimicrobials should not be counted as appropriate.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Identify a sample of 30 no-pneumonia encounters per health facility and determine the number prescribed antibiotics. Identify another sample of 30 pneumonia encounters in each of the same 20 facilities and determine the number prescribed appropriate antibiotics. Identify encounters by consulting daily registers, patient records, prescription slips, or through observation.
20 Drug retail outlets	Data collected through simulated purchase	The sample size for drug retail outlets is 20 sites, so 20 simulated purchases will be conducted.

Before the study, organizers should develop a list of which medications are to be counted as antibiotics. Organizers should also discuss, and reach consensus on, a list of local terms used to describe symptoms that may be listed in health facility records to denote cases of pneumonia and cases of no-pneumonia (cough or cold). This list can be used as a reference by data collectors. Efforts should be made first to gather the data retrospectively from medical records. If the data are not available from records, then as an alternative, the data can be collected prospectively from observation. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.)

For indicator 9, use the lists of local terms and antibiotics described above to select a sample of 30 patient encounters diagnosed as no-pneumonia (cough or cold) from each MOH health facility. Count the number of encounters prescribed antibiotics. (To avoid confusion or the need for interpretation by data collectors, all drugs prescribed should be transcribed on the data collection forms. Identification of specific antibiotics can be carried out during data analysis.) Count separately the number of patients who are prescribed one or more antibiotics. If a patient receives two or more antibiotics, this counts as one instance for this purpose. Include only patients two months to five years of age needing curative care.

For indicator 10, use the lists of local terms and antibiotics described above to select another sample of 30 patient encounters diagnosed as pneumonia. Count the number of encounters prescribed antibiotics. (To avoid confusion or the need for interpretation by data collectors, all drugs prescribed should be transcribed on the data collection forms. Identification of specific antibiotics can be carried out during data analysis.) Include only patients two months to five years of age needing curative care.

Note: Pneumonia encounters may be difficult to identify at the health facility level. For pneumonia, review four months of records; if fewer than five cases in total have been identified, abandon the process for pneumonia for that facility. If more than five have been identified, continue the selection process for the 12-month period and stop, even if fewer than 30 encounters have been identified. The time required to review 12 months of records for a probable data set of fewer than 15 cases is not efficient use of the limited time available.

For drug retail outlets, follow the simulated purchases scenario for ARI outlined in the *Data Collector's Guide*. This means that data will only be collected for indicator 9, since the simulation will only be based on symptoms of no-pneumonia (cough or cold) rather than pneumonia.

See DUS-1: Medical Records Review Form and DUS-4A: Simulated Purchase Form in the *Data Collector's Guide*.

Computation & Example: For each facility in a sample, both indicators are recorded as percentages, computed by dividing the number of patient encounters during which an antibiotic is prescribed for no-pneumonia (cough or cold) encounters or for which an appropriate antibiotic was prescribed for pneumonia encounters, by the total number of patient encounters surveyed, and multiplying by 100. The overall indicators are the averages of these facility-specific percentages. Along with this average, provide range figures.

$$\text{\% of No-Pneumonia Encounters Prescribed Antibiotics} = \frac{\text{Total \# of No-Pneumonia Encounters Prescribed Antibiotics}}{\text{Total \# of No-Pneumonia Encounters Surveyed}} \times 100$$

$$\text{\% of Pneumonia Encounters Prescribed Appropriate Antibiotics} = \frac{\text{Total \# of Pneumonia Encounters Prescribed Appropriate Antibiotics}}{\text{Total \# of Pneumonia Encounters Surveyed}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{\% of No-Pneumonia Encounters Prescribed Antibiotics} = \frac{8}{30} \times 100 = 26.6\%$$

$$\text{\% of Pneumonia Encounters Prescribed Appropriate Antibiotics} = \frac{18}{24} \times 100 = 75\%$$

? If for 20 health facilities surveyed, data for a sample of 600 patient encounters for indicator 9 showed that a total of 253 patient encounters received antibiotics for treatment of no-pneumonia (cough or cold), then the average for all facilities would be:

$$\text{\% of No-Pneumonia Encounters Prescribed Antibiotics for All Facilities} = \frac{253}{600} \times 100 = 42.2\%$$

? For the same 20 health facilities, data for a separate sample of 413 patient encounters for indicator 10 showed that a total of 329 patient encounters received appropriate antibiotics for treatment of pneumonia, then the average for all facilities would be:

$$\text{\% of Pneumonia Encounters Prescribed Appropriate Antibiotics for All Facilities} = \frac{329}{413} \times 100 = 79.6\%$$

? If a sample of 20 drug retail outlets where ARI simulated purchases were conducted for indicator 9 showed that a total of 14 patient encounters received antibiotics for treatment of no-pneumonia (cough or cold), then the average for the 20 drug retail outlets would be:

$$\text{\% of No-Pneumonia Encounters Prescribed Antibiotics} = \frac{\text{Total \# of No-Pneumonia Encounters Prescribed Antibiotics}}{\text{Total \# of Simulated Purchases}} \times 100$$

$$\text{\% of No-Pneumonia Encounters Prescribed Antibiotics} = \frac{14}{20} \times 100 = 70\%$$

Presentation: In a survey of 20 health facilities in country Z, antibiotics were prescribed for the treatment of no-pneumonia (cough or cold) during 42% of all outpatient encounters, with a range of 8% to 73% among facilities. For the same 20 facilities, appropriate antibiotics were prescribed for the treatment of pneumonia during 79.6% of all outpatient encounters, with a range of 54% to 92% among facilities.

In a survey conducted through simulated purchases of 20 drug retail outlets in the same country Z, antibiotics were prescribed for no-pneumonia in 14 encounters, or 70% of those surveyed.

11. Percentage of encounters diagnosed as diarrhea that are prescribed ORS (F/D)

12. Percentage of encounters diagnosed as diarrhea that are prescribed antidiarrheals (F/D)

13. Percentage of encounters diagnosed as non-dysentery/non-cholera diarrhea that are prescribed antibiotics (F/D)

Rationale: These indicators attempt to measure the degree of adherence and non-adherence with IMCI treatment guidelines. They are listed here together because the three indicators represent positive and negative outcomes of the same area of prescribing practice, drug treatment for diarrhea.

Definition: These indicators measure the percentage of diarrhea encounters that are prescribed ORS, antidiarrheals, or antibiotics. For the treatment of diarrhea it is appropriate, according to WHO IMCI treatment guidelines, to prescribe ORS. In general, antidiarrheals are not recommended for treating childhood diarrhea. Antibiotics are only appropriate when the diarrhea is caused by cholera or dysentery.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Determine the number of diarrhea encounters prescribed ORS, antidiarrheals, or antibiotics for a sample of 30 patients with diarrhea per facility by consulting daily registers, patient records, prescription slips, or through observation.
20 Drug retail outlets	Data collected through simulated purchase	The sample size for drug retail outlets is 20 sites per IMCI health problem; therefore, 20 diarrhea simulated purchases should be conducted.

Efforts should be made first to gather the data retrospectively from medical records. If the data are not available from records, then, as an alternative, the data can be collected prospectively from observation. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.)

Select a sample of 30 patient encounters diagnosed as diarrhea from each facility. Organizers should discuss, and reach consensus on, a list of local terms used to describe symptoms that may be listed in health facility records to denote cases of diarrhea. For indicator 13, simple diarrhea will need to be distinguished from more complicated cases, such as dysentery and cholera, where prescribed antibiotics would be appropriate. This list can be used as a reference by data collectors. (To avoid confusion or the need for interpretation by data collectors, all drugs prescribed should be transcribed exactly as listed in the patient record to the data collection forms.)

Count the number of encounters prescribed ORS. From the same sample, count separately the number of patients that are prescribed antidiarrheals. Also as a separate number, count the number prescribed antibiotics. Patients that are prescribed ORS and an antibiotic, for example, should be counted once for the ORS group, and once for the antibiotic group. Only include encounters with children two months to five years old.

For drug retail outlets, follow the simulated purchases scenario for diarrhea outlined in Chapter 3.

See DUS-1: Medical Records Review Form and DUS-4B: Simulated Purchase Form in the *Data Collector's Guide.*

Computation & Example: For each facility in a sample, all three indicators are recorded as percentages, computed by dividing the number of diarrhea patient encounters during which ORS is prescribed for diarrhea, by the total number of diarrhea patient encounters surveyed, and multiplying by 100. The overall indicators are the averages of these facility-specific percentages. Along with this average, provide range figures.

$$\text{\% of Encounters Prescribed ORS for Diarrhea} = \frac{\text{Total \# of Encounters Prescribed ORS for Diarrhea}}{\text{Total \# of Diarrhea Encounters Surveyed}} \times 100$$

$$\text{\% of Encounters Prescribed Antidiarrheals for Diarrhea} = \frac{\text{Total \# of Encounters Prescribed Antidiarrheals for Diarrhea}}{\text{Total \# of Diarrhea Encounters Surveyed}} \times 100$$

% of Encounters Prescribed Antibiotics for Non-Dysentery/ Non-Cholera Diarrhea = Total # of Encounters Prescribed Antibiotics for Diarrhea / Total # of Non-Dysentery/ Non-Cholera Diarrhea Encounters x 100

? For example, results from one health facility are calculated as follows:

% of Diarrhea Encounters Prescribed ORS = 21/30 x 100 = 70%

% of Diarrhea Encounters Prescribed Antidiarrheals = 9/30 x 100 = 30%

% of Non-Dysentery/Non-Cholera Diarrhea Encounters Prescribed Antibiotics = 13/30 x 100 = 43.3%

? If for 20 health facilities surveyed, data for a sample of 600 patient encounters showed that a total of 476 patient encounters received ORS for treatment of diarrhea, then the average for all facilities would be:

% of Diarrhea Encounters Prescribed ORS for All Facilities = 476/600 x 100 = 79.3%

? If for 20 health facilities surveyed, data for the same sample of 600 patient encounters showed that a total of 124 patient encounters received antidiarrheals for treatment of diarrhea, then the average for all facilities would be:

% of Diarrhea Encounters Prescribed Antidiarrheals for All Facilities = 124/600 x 100 = 20.7%

? If for 20 health facilities surveyed, data for the same sample of 600 patient encounters showed that a total of 281 patient encounters received antibiotics for treatment of non-dysentery/non-cholera diarrhea, then the average for all facilities would be:

$$\text{\% of Non-Dysentery/Non-Cholera Diarrhea Encounters Prescribed Antibiotics for All Facilities} = \frac{281}{600} \times 100 = 46.8\%$$

? For a sample of 20 drug retail outlets where diarrhea simulated purchases were conducted, results are as follows:

$$\text{\% of Diarrhea Encounters Prescribed ORS} = \frac{9}{20} \times 100 = 45\%$$

$$\text{\% of Diarrhea Encounter Prescribed Antidiarrheals} = \frac{8}{20} \times 100 = 40\%$$

$$\text{\% of Non-Dysentery/Non-Cholera Diarrhea Encounters Prescribed Antibiotics} = \frac{14}{20} \times 100 = 70\%$$

Presentation: In a survey of 20 health facilities in country Z, ORS was prescribed for the treatment of diarrhea during 79.3% of all outpatient encounters, with a range of 53% to 94% among facilities. Antidiarrheals were prescribed for the treatment of diarrhea during 20.7% of encounters, with a range of 9% to 47%. Antibiotics were prescribed for treatment of non-dysentery/non-cholera diarrhea during 46.8% of encounters, with a range of 17% to 76% among facilities.

In a survey conducted through simulated purchases of 20 drug retail outlets in the same country Z, ORS was prescribed for the treatment of diarrhea during 45% of encounters. Antidiarrheals were prescribed for the treatment of diarrhea during 40% of encounters. Antibiotics were prescribed for the treatment of non-dysentery/non-cholera diarrhea during 70% of encounters.

14. Percentage of encounters diagnosed as malaria that are prescribed an appropriate oral antimalarial, according to treatment guidelines (F/D)

Rationale: This indicator measures the degree of adherence with IMCI treatment guidelines. The area where the survey is performed must be categorized, based on epidemiological data, as an area with "high malaria risk" or an area with "low malaria risk." According to the IMCI guidelines, in the high malaria risk areas, any fever is considered malaria and should be treated accordingly, thus indicator 14 applies. In a low malaria risk area, this indicator still applies, but it may be difficult to obtain a sufficient number of cases.

In low malaria risk areas, a simple fever should not be treated as malaria. Prescribing antimalarials for a fever in a low malaria risk area is an inappropriate use of antimalarials. Using antimalarials when they are not needed is costly, reduces availability of funds for other more serious health problems, and contributes to resistance. In countries where the combination of sulfadoxine and pyrimethamine is used as the first-choice oral antimalarial, the side effects of the treatment may pose a more serious threat to the health of the child than the low risk of malaria itself.

Definition: "Fever" is retained as classification for a condition that provokes fever, but does not require antibiotics or antimalarials. In practice, many of these conditions will coincide with the no-pneumonia and pneumonia conditions described for indicators 9 and 10, or for the measles condition, described under supplemental indicators in Annex 3.

An appropriate antimalarial includes those antimalarials listed in the IMCI guidelines for treatment of malaria. The WHO IMCI treatment guidelines list chloroquine and the combination of sulfadoxine and pyrimethamine as appropriate oral antimalarials for the treatment of malaria. Depending on the country, either chloroquine or the combination of sulfadoxine and pyrimethamine will be considered the appropriate antimalarial treatment. The antimalarial that is not retained as the choice treatment for malaria will be considered inappropriate: The choice depends on the prevalence of chloroquine-resistant malaria. If there is resistance, chloroquine is inappropriate; if there is no resistance, chloroquine should be the antimalarial used.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Identify a sample of 30 malaria encounters per health facility and determine the number prescribed antimalarials. In areas with low malaria risk, identify another sample of 30 fever encounters in each of the same 20 facilities and determine the number prescribed antimalarials. Identify encounters by consulting daily registers, patient records, prescription slips, or through observation.
20 Drug retail outlets	Data collected through simulated purchase	The sample size for drug retail outlets is 20 sites, so 20 simulated purchases will be conducted.

Before the study, organizers should decide which antimalarial is the appropriate one for the area where the survey takes place. Organizers should also discuss and reach consensus on a list of local terms used to describe symptoms that may be listed in health facility records to denote cases of malaria. Likewise a list should be drawn of all terms that cover conditions that correspond with the no-malaria fever. Efforts should be made first to gather the data retrospectively from medical records. If the data are not available from records, then, as an alternative, the data can be collected prospectively from observation. In many areas malaria is seasonal, which may limit the usefulness of the prospective data collection if the survey falls outside the malaria season. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.)

Use the list of terms described above to select a sample of 30 patient encounters two months to five years of age, diagnosed as malaria from each MOH health facility. All drugs prescribed should be transcribed on the data collection forms. Count the number of encounters prescribed an oral antimalarial. Identification of specific antibiotics can be carried out during data analysis.

Note: Malaria encounters may be difficult to identify at the health facility level in areas with low malaria risk or in areas with a clear seasonal pattern for malaria. In these areas, review four months of records, starting from the last month of the malaria season. If fewer than five cases in total have been identified, abandon the process for malaria in that facility. If five or more cases have been identified, continue the selection process for the 12-month period and stop, even if fewer than 30 encounters have been identified. The time required to review 12 months of records for a probable data set of less than 15 cases is not efficient use of the limited time available.

For drug retail outlets, follow the simulated purchases scenario for malaria outlined in the *Data Collector's Guide*.

See DUS-1: Medical Records Review Form and DUS-4C: Simulated Purchase Data Form in the *Data Collector's Guide*.

Computation & Example: For each facility in a sample, the indicator is recorded as a percentage of the total number of patient encounters surveyed. The percentage is computed by dividing the number of malaria patient encounters during which an antimalarial is prescribed for malaria by the total number of malaria patient encounters surveyed, and multiplying by 100. The overall indicator is the average of the facility-specific percentages. Along with this average, provide range figures.

$$\text{\% of Malaria Encounters Prescribed an Appropriate Antimalarial} = \frac{\text{Total \# of Malaria Encounters Prescribed Antimalarials}}{\text{Total \# of Malaria Encounters Surveyed}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{\% of Malaria Encounters Prescribed an Appropriate Antimalarial} = \frac{8}{24} \times 100 = 33.3\%$$

? If for 20 health facilities surveyed, data for a sample of 518 patient encounters showed that a total of 406 patient encounters received an appropriate antimalarial for treatment of malaria, then the average for all facilities would be:

% of Malaria Encounters Prescribed an Appropriate Antimalarial for All Facilities = $\frac{406}{518}$ x 100 = 78.4%

? If a sample of 20 drug retail outlets where malaria simulated purchases were conducted showed that a total of 14 patient encounters received appropriate antimalarials for treatment of malaria, then the average for the 20 drug retail outlets would be:

% of Malaria Encounters Prescribed an Appropriate Antimalarial = $\frac{\text{Total \# of Malaria Encounters Prescribed Antimalarials}}{\text{Total \# of Simulated Purchases}}$ x 100

% of Malaria Encounters Prescribed an Appropriate Antimalarial = $\frac{14}{20}$ x 100 = 70%

Presentation: In a survey of 20 health facilities in country Z, an appropriate antimalarial was prescribed for the treatment of malaria during 78.4% of all outpatient encounters classified as having malaria, with a range of 38% to 89% among facilities.

In a survey conducted through simulated purchases of 20 drug retail outlets in the same country Z, an appropriate antimalarial was prescribed in 14 encounters presenting with complaints compatible with malaria, or 70% of those surveyed.

15. Average cost of drugs prescribed as a percentage of costs if IMCI norms for treatment were followed (F/D)

Rationale: One of the basic tenets for promoting the IMCI strategy for caring for sick children is that the use of standardized treatment guidelines, if followed, will provide cost-effective, appropriate care that is likely to be cheaper than the cost of care if guidelines are not followed. Based on the assumption that IMCI results in the optimal cost, this indicator is useful to gain control over drug treatment costs.

Definition: This indicator measures the average cost of drugs prescribed currently for an IMCI health problem and compares the average to what drug treatment would cost if IMCI treatment guidelines were followed. The comparison is depicted mathematically as a percentage.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Determine all drugs prescribed for an IMCI encounter for a sample of 30 patients per facility by consulting daily registers, patient records, prescription slips. Use the same sample of diarrhea, pneumonia, no-pneumonia, and malaria encounters identified for indicators 9 to 14.
20 Drug retail outlets	Data collected through simulated purchase	Determine all drugs prescribed for an IMCI encounter for a sample of 20 simulated purchases for ARI, 20 simulated purchases for diarrhea, and 20 for malaria.

Before collecting the sample of encounters, organizers should meet with the data collectors to discuss the proper way to collect the data. All health problems and all drugs per encounter should be recorded. (To avoid confusion or the need for interpretation by data collectors, all drugs prescribed should be transcribed exactly as listed in the patient record to the data collection forms. In addition to the name of the drug, it is important to record the dosage strength, dosage form, and length of drug therapy or amount of drug dispensed. Verifying cost information can be carried out during data analysis).

Include only outpatients seeking curative care. Efforts should be made first to gather the data retrospectively from daily registers, medical records, or prescription slips. If the data are not available from records, then as an alternative, the data can be collected prospectively from observation. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.) Encounters only include children two months to five years old with an IMCI health problem.

When these data are entered in the DMCI software, only one diagnosis is entered for each child. All of the drugs prescribed for that child are attributed to one diagnosis. If the child has multiple diagnoses, this may mean that some drugs are incorrectly attributed to a diagnosis. As described in the Preparing the Data section in Annex 6 (see p. 233), the diagnosis to enter for the child is selected according to a priority ranking of disease severity. This means that the diagnoses most likely to require antibiotics (generally the more expensive products) are the diagnoses to be entered. In the case of a child with, for example, pneumonia and diarrhea, pneumonia would be entered as the more severe diagnosis and all drugs for the child, including possibly ORS, would be entered as the treatment for pneumonia.

Although this is not ideal, to-date it has not caused major problems in data analysis. In the above example, the cost of ORS would be small relative to the cost of the other drugs, and would therefore represent only a minor additional percentage of the total cost of treatment. The purpose of this indicator is to provide a gross indication of relative treatment costs for IMCI managers. The DMCI software does identify encounters with multiple diagnoses. When the survey data is entered and analyzed, the survey organizer can request a frequency count to determine how many encounters had multiple diagnoses. This will help to inform the survey results and determine if further analysis is necessary.

See DUS-1: Medical Records Review Form in the *Data Collector's Guide*.

Computation & Example: This indicator is recorded as a percentage. First, for a sample of encounters, calculate the total cost of all drugs prescribed for a health problem. This should be divided by the total cost of drug treatment recommended in IMCI treatment guidelines for the same health problem. (To determine the IMCI cost, all costs should be based on the prices collected in the drug retail outlets on data collection form DUS-1. Ideally, the median price of all of the prices collected for a drug should be used for the calculations, which are based on the country's IMCI standard treatment for a disease.) Then, multiply the result by 100. This should be calculated for each health problem.

$$\text{Percentage of Costs if IMCI Norms of Treatment Were Followed} = \frac{\text{Total Cost of Drugs Prescribed for the Health Problem}}{\text{Total Cost of IMCI Drugs Recommended for the Same Health Problem}} \times 100$$

? For example, results from one health facility for treatment of pneumonia are as follows:

$$\text{Percentage of Costs if IMCI Norms of Treatment Were Followed} = \frac{\$5.05}{\$2.07} \times 100 = 244\%$$

? Another example where results from one health facility for treatment of pneumonia were less than IMCI costs are as follows:

$$\text{Percentage of Costs if IMCI Norms of Treatment Were Followed} = \frac{\$1.77}{\$2.07} \times 100 = 85.5\%$$

? If for 20 health facilities surveyed, data for a sample of 600 pneumonia patient encounters showed a total cost of $3,412 for drug treatment, then the average for all facilities would be:

$$\text{Average Cost of Drugs Prescribed for Pneumonia Treatment in All Facilities} = \frac{\$3,412}{600} = \$5.69$$

$$\text{Percentage of Costs if IMCI Norms of Treatment Were Followed} = \frac{\$5.69}{\$2.07} \times 100 = 275\%$$

? If a survey of 20 drug retail outlets conducted through 20 simulated purchases for ARI showed a total cost of $162 for drug treatment, then the average for the 20 drug retail outlets would be:

$$\text{Average Cost of Drugs Prescribed for Pneumonia Treatment in Drug Retail Outlets} = \frac{\$162}{20} = \$8.10$$

$$\text{Percentage of Costs if IMCI Norms of Treatmen Were Followed} = \frac{\$8.10}{\$2.07} \times 100 = 391\%$$

Presentation: In a survey of 20 health facilities in country T, the average cost of drugs prescribed for the treatment of pneumonia was $5.69. This cost was almost three times, or 275%, higher than the drug treatment recommended by the IMCI treatment guidelines. For 20 drug retail outlets in the same country, the cost was 391% higher.

16. Percentage of prescribed drugs actually dispensed (F)

Rationale: This indicator measures the ability of a sample of health facilities to dispense the right drug to caregivers.

Definition: Drugs that are actually dispensed are defined as prescribed drugs that are dispensed from the health facility. In this indicator, it is based only on the prescriptions presented for dispensing in IMCI encounters.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Health facility supervisor for permission to conduct exit poll interviews	Number of drugs dispensed and the total number of drugs that were prescribed in a sample of 10 to 15 IMCI dispensing encounters at each health facility, by conducting exit poll interviews

At each of the 20 MOH health facilities, data collectors conducting the exit poll interviews should use the same sample of caregiver encounters used for previously described indicators. Conduct the exit poll interviews as described in the *Data Collector's Guide*. Include only caregivers of patients two months to five years of age needing curative care.

See DUS-3: Exit Poll Interview Form in the *Data Collector's Guide*.

Computation & Example: For each MOH facility in the sample, indicators are recorded as percentages, computed by dividing the number of drugs actually dispensed by the total number of prescribed drugs that were presented for dispensing, and multiplying this quotient by 100. The overall indicator is an average of these drug outlet-specific percentages. Along with this average, provide the range figures.

$$\text{\% of Prescribed Drugs That Are Dispensed} = \frac{\text{Number of Drugs Actually Dispensed}}{\text{\# of Prescribed Drugs Presented for Dispensing}} \times 100$$

? The result for one MOH health facility is calculated as follows:

$$\text{\% of Prescribed Drugs That Are Dispensed} = \frac{7}{13} \times 100 = 53.8\%$$

? If, for 20 MOH health facilities, data for a sample of 194 exit poll interview encounters showed that 115 prescribed drugs were actually dispensed, of 155 prescriptions presented for dispensing, then the average for all MOH facilities would be calculated as follows:

$$\text{Average \% of Prescribed Drugs That Are Dispensed for All MOH Facilities} = \frac{115}{155} \times 100 = 74\%$$

Presentation: In country P, for a sample of 20 MOH health facilities, an average of 74% of prescribed drugs presented for dispensing were actually dispensed, with a range from 47% to 90% among health facilities.

17. Percentage of caregivers who could correctly describe how to give the prescribed medication

Rationale: This indicator is useful to measure the potential for non-adherence and possible treatment failure due to the lack of knowledge of caregivers on how to administer medication correctly.

Definition: Ideally, every caregiver has an idea about what the drug is prescribed for, the dose, the frequency, how to administer the drug and the number of days the drug should be given. However, there are a few key items that are more critical than others. To correctly describe how to take the medication, the caregiver should know the dose to administer, how many times a day, and for how many days. All three of these items should be mentioned verbally by the caregiver for the encounter to be considered correct.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Health facility for permission to conduct exit poll interviews with caregivers of sick children	Identify a convenience sample (i.e., patients in the clinic during the day of data collection) of 10 to 15 caregivers of patients two months to five years of age needing curative care for any health problem in each health facility.
20 Drug retail outlets	Exit poll interviews of caregivers of sick children. Store managers should be unaware of the process so no permission is needed.	Identify a convenience sample (i.e., patients who leave a drug retail outlet with medication during the day of data collection) of 10 to 15 caregivers of patients two months to five years of age needing curative care for any health problem in each drug retail outlet.

At each of the 20 MOH health facilities, data collectors conducting the exit poll interviews should use the same sample of caregiver encounters used for previously described indicators. Conduct the exit poll interviews as described in

the *Data Collector's Guide*. Include only caregivers of patients two months to five years of age needing curative care.

At the 20 drug retail outlets, conduct the exit poll interviews as described in Chapter 3. Record the drug information provided by the caregiver, using prompting questions if necessary. Check the prescription and record all the information on the drug actually dispensed. Each prescribed drug should be counted separately.

See DUS-3: Exit Poll Interview Form in the *Data Collector's Guide*.

Computation & Example: For each MOH facility and/or drug retail outlet in the sample, indicators are recorded as percentages, computed by dividing the number of drugs actually dispensed by the total number of prescribed drugs presented for dispensing, and multiplying this quotient by 100. The overall indicator is an average of these drug outlet-specific percentages. Along with this average, provide the range figures.

$$\text{\% of Caregivers Who Correctly Describe How to Give the Medication} = \frac{\text{Number of Caregivers Who Correctly Describe How to Give Medication}}{\text{Number of Caregivers Interviewed}} \times 100$$

? The result for one MOH health facility is calculated as follows:

$$\text{\% of Caregivers Who Correctly Describe How to Give the Medication} = \frac{7}{13} \times 100 = 53.8\%$$

? If, for 20 MOH health facilities, data for a sample of 194 exit poll interview encounters showed that 101 caregivers described correctly how to give the medication, then the average for all MOH facilities would be calculated as follows:

$$\text{Average \% of Caregivers Who Correctly Described How to Give the Medication} = \frac{101}{194} \times 100 = 52.1\%$$

? The results for 20 drug retail outlets is calculated as follows:

$$\text{\% of Caregivers Who Correctly Described How to Give the Medication} = \frac{90}{200} \times 100 = 45\%$$

Presentation: In country P, for a sample of 20 MOH health facilities, an average of 52% of caregivers correctly described how to give the medication to their children, with a range from 37% to 90% among health facilities.

In a survey conducted through exit poll interviews with caregivers at 20 drug retail outlets in the same country P, an average of 45% could describe correctly how to give the medicine to their children.

18. Percentage of encounters where health workers asked one or more clinical questions from IMCI guidelines to determine severity of health problem (F)

Rationale: The IMCI approach requires that health workers assess and manage every sick child coming to the health facility in a comprehensive manner. The IMCI guidelines outline a series of screening questions concerning each child that promotes evaluation, classification, and treatment of infants and children for the five IMCI health problems. Observing whether health workers ask clinical questions regarding the child's health problem will allow identification of areas where IMCI training should focus. This indicator will help to determine if IMCI guidelines are being followed.

Definition: An encounter is defined as a session in which the health worker is focusing on one child. If a caregiver consults a health worker about each of her two children, the consultation regarding each child is considered a separate encounter.

This indicator is targeting instances where one or more clinical questions were asked. Clinical questions from IMCI guidelines include questions that assess whether the child is in critical condition, e.g., can the child breastfeed or drink; does the child vomit all he or she ingests; or has the child had convulsions, and questions that address the IMCI health problems regarding symptoms such as difficulty when breathing and episodes of diarrhea, fever, ear pain, malnutrition, or anemia.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Health facility supervisor for permission to observe	Observe 10 to 15 encounters for children two months to five years for any health problem in each health facility.

Working in teams of two, follow the procedures outlined in Chapter 4, Define Methods for Drug Use Study. The data collector as observer will be located in the examination room close enough to the health worker to be able to hear and observe the interaction clearly and accurately. The data collector must be as unobtrusive as possible and not disrupt the consultation. Any active role by the data collector during the consultation could bias the responses of the caregiver or the behavior of the health worker. If the data collector is engaged in any interaction during a consultation, that observation should not be considered part of the study and another consultation should be surveyed in its place. A new observation questionnaire should be completed for each infant or child seen.

The data collector should listen to ensure that the health worker asks at least one of the following questions (the wording of the questions may vary):[11]

? Is the child able to drink or breastfeed?
? Does the child vomit everything?
? Has the child had convulsions or attacks?
? Is the child lethargic?
? Was the child unconscious?

If the data collector does not hear any of those questions or questions that are asking the same thing in different words, then that encounter can be counted as one with no clinical questions from the IMCI guidelines. A new form should be filled out for each encounter.

The USAID/BASICS *Integrated Health Facility Assessment Manual* also includes an assessment instrument that observes health workers' interactions with patients. The observations note whether the health workers ask the patients' medical history of IMCI health problems and symptoms in questions 7 to 15 of the BASICS "Observation Checklist—Sick Child" questionnaire. These data could be used to compute this indicator, as explained below.

See DUS-2: Observation of Health Workers Data Form in the *Data Collector's Guide*.

Computation & Example: This indicator is a percentage. It is computed by dividing the total number of practitioners asking one or more clinical questions by the total number of encounters and multiplying that quotient by 100, to convert the decimal to a percentage. Along with this average, provide the range figures.

$$\text{Percentage of Health Workers Who Ask One or More Clinical Questions from IMCI Guidelines} = \frac{\text{Total \# Practitioners Asking One or More Clinical Questions}}{\text{Total \# Encounters}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{Percentage of Health Workers Who Ask One or More Clinical Questions from IMCI Guidelines} = \frac{7}{13} \times 100 = 53.8\%$$

[11]WHO. September 1996. *Integrated Management of Childhood Illness Process Course*. (ODUS/HCP/HCT/ARI/CDD/96.4L); Assess and Classify the Sick Child.

? If a survey of 20 health facilities were conducted through observation of health workers, results from all health facilities are calculated as follows:

$$\text{Percentage of Health Workers Who Ask One or More Clinical Questions from IMCI Guidelines} = \frac{185}{285} \times 100 = 65.0\%$$

If the data collection effort relies on the USAID/BASICS *Integrated Health Facility Assessment Manual* survey data, then any encounter where questions 5 to 27 from the "Observation Checklist—Sick Child" were all negative would be counted as an encounter with no clinical questions.

Presentation: For example, in a survey of 285 encounters in 20 health facilities, 65.0% of encounters included one or more clinical questions from the IMCI guidelines, with a range from 34.5% to 86.7%.

19. Percentage of health workers who provided basic information to caregivers on how to give the recommended drug(s) (F/D)

Rationale: This indicator measures whether health workers are able to communicate to patients how to take their medication. This component is important in gaining an understanding of patient use of medication and patient education.

Definition: The definition for "basic information" includes the dose and the frequency of medication use, how to prepare the drug, or any potential side effects or symptoms associated with the drug. If the health worker explains at least one of these aspects to the patient, then, for this indicator, it will be considered that the health worker has provided information regarding the prescribed drug. Failure to directly discuss any of these issues with the patient will be considered as not providing any information.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Health facility supervisor for permission to observe	Observe 10 to 15 encounters for children two months to five years for any health problem in each health facility.
20 Drug retail outlets	Data collection is done as a simulation. Store managers should be unaware of the process so no permission is needed.	Determine the prescribing practice for a sample of 20 simulated purchases for ARI, 20 simulated purchases for diarrhea, and 20 simulated purchases for malaria.

Working in teams of two, follow the procedures outlined in Chapter 4, Define Methods for Drug Use Study. As with the previous indicator, the data collector will be located in the examination room close enough to the health worker to be able to hear and observe the interaction clearly and accurately. The data collector must be as unobtrusive as possible and not disrupt the consultation. Any active role by the data collector during the consultation could bias the responses of the caregiver or the behavior of the health worker. If the surveyor is engaged in any interaction during a consultation, that observation should not be considered at all. A new observation questionnaire should be completed for each infant or child seen.

For each encounter observed, the data collector will note whether any information regarding the drug was given to the patient. The type of information the data collector should listen for is:

? What is the dose?
? How to measure the dose for a small child?
? What is the frequency of the dose?
? How long the child should take the drug?
? Are there any special instructions for giving the drug?

For example, if a child is diagnosed with diarrhea and ORS is prescribed, then the data collector should expect to hear about the preparation of the solution with boiled water and the frequency with which the solution should be administered. If the data collector does not hear any of the above questions addressed, then he or she can consider that during the encounter the practitioner did not provide any information.

This information can also be obtained by looking at the USAID/BASICS *Integrated Health Facility Assessment Manual* and questions 49-64 on the "Observation Checklist—Sick Child" survey instrument. Question 64 is the most direct question regarding explaining how to administer medication. If that question is affirmative, then this indicator should also be considered affirmative. BASICS survey questions 64 a-c, from the same form, provide the opportunity to check the extent of the information communicated to the patient by the health worker.

Note: In several countries the BASICS survey instruments have been adapted to be country-specific. Therefore, the question numbers mentioned may not correspond with what is available in a specific country.

See DUS-2: Observation of Health Workers Data Form in the *Data Collector's Guide*.

Computation & Example: The data collector should note whether the practitioner provides any information regarding any of the drugs for each encounter. The indicator is a percentage. Therefore, the number of practitioners providing information is divided by total number of encounters, and should be multiplied by 100 to obtain a percentage. Along with this average, provide the range figures.

$$\text{Percentage of Health Workers Who Provided Information to Caregiver on How to Give Recommended Drug(s)} = \frac{\text{Total \# Health Workers Providing Information}}{\text{Total \# Encounters}} \times 100$$

? For example, results from one health facility are calculated as follows:

Percentage of Health Workers Who Provided Information to Caregiver on How to Give Recommended Drug(s)	=	10/14	x	100	=	71.4%

? If, for 20 health facilities surveyed, data for a sample of 245 caregiver encounters showed that in 183 encounters health workers provided basic information to the caregiver on how to give the recommended drug(s), then the average for all facilities would be calculated as follows:

Percentage of Health Workers Who Provided Information to Caregiver on How to Give Recommended Drug(s)	=	183/245	x	100	=	74.6%

? If, for 20 drug retail outlets surveyed, data for a sample of 60 caregiver encounters showed that 35 health workers provided basic information to the caregiver on how to give the recommended drug(s), then the average for all drug retail outlets would be calculated as follows:

Percentage of Health Workers Who Provided Information to Caregiver on How to Give Recommended Drug(s)	=	35/60	x	100	=	58.3%

When using the USAID/BASICS *Integrated Health Facilities Assessment Manual* survey data, an affirmative answer to any part of question 64 of the "Observation Checklist—Sick Child" will indicate that health worker has fulfilled the conditions of this indicator.

Presentation: In a survey of 20 health facilities in country T, an average of 74.6% of health workers provided basic information to caregivers on how to give recommended drug(s), with a range from 53% to 89% among health facilities.

In a survey conducted at 20 drug retail outlets in the same country T, an average of 58.3% of health workers provided basic information to caregivers on how to give recommended drug(s), with a range from 42% to 90%.

20. Percentage of health workers who told caregivers about any signs of progressive illness and recommended a visit to a doctor or clinic if the signs appear (F/D)

Rationale: The IMCI guidelines recommend that all patients be evaluated, diagnosed, treated, and followed up. This process allows detection of both acute and chronic conditions. The ability of health workers to ensure follow-up care and patient education is an essential component of the IMCI process. Therefore, this indicator addresses continuity of care and focuses on whether the health worker is communicating to the caregiver signs of progressive illness and encouraging follow-up treatment. Rapid identification of acute cases of illness may improve the health facility's ability to treat children adequately and reduce child mortality.

Definition: This indicator measures the health worker's ability to recommend or emphasize the importance of follow up with the patient. The IMCI guidelines provide examples of the types of signs of progressive illness for which to watch. The guidelines also provide routine follow-up questions, as well as questions that focus on identification of progressive illness. The following signs of progressive illness and recommendations are outlined for each IMCI health problem in the guidelines.

Pneumonia — If after two days the child is lethargic or unconscious, has convulsions, vomits or is not able to drink or breastfeed, or the child's chest is in-drawing or stridor, then child should be referred urgently to the hospital. If the breathing rate, fever, and eating of the child are the same, then child should return to health facility to change to a second-line antibiotic. However, if the child is experiencing slower breathing, less fever, or eating better, then child should complete the antibiotic, but does not need to return to the health facility.

Diarrhea — If after two days the number of stools, amount of blood in stools, fever, abdominal pain, or eating is the same or worse, then the child should return to the health facility. In addition, if the child has persistent diarrhea (three or more loose stools per day) for five days without the other symptoms, then the child should return to a health facility.

Malaria — If the fever persists after 2 days or returns within 14 days, the caregiver should follow up in a health facility. If signs of rigidity in the nape of the neck are also present, then the patient should be referred to the hospital for assessment immediately.

Measles — If after two days pus is still draining from the eye despite correct application of treatment, or if mouth ulcers are worse, or there is a very foul smell from the mouth, then refer child to a hospital. If pus is gone but redness remains in the eyes, or if mouth ulcers are the same or better, then treatment should be continued.

Ear Problem — If after five days of antibiotics there is pain to the touch behind the ear or tender swelling or fever, then urgently refer to a hospital for suspected mastoiditis.

Malnutrition — If after 30 days the child continues to have a very low weight for his or her age, then caregiver should be counseled on health feeding practices.

Anemia — If after 14 days the child still has visible severe wasting, or severe palmar pallor, or edema of both feet, then the child should be referred to a hospital.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Health facility supervisor for permission to observe	Observe 10 to 15 encounters for children two months to five years old for any health problem in each health facility.
20 Drug retail outlets	Data collection is done as a simulation. Store managers should be unaware of the process so no permission is needed.	Determine the prescribing practice for a sample of 20 simulated purchases for ARI, 20 simulated purchases for diarrhea, and 20 simulated purchases for malaria.

The data collector as observer will be located in the examination room close enough to the health worker to be able to hear and observe the interaction clearly and accurately. The data collector must be as unobtrusive as possible and not disrupt the consultation. Any active role by the data collector during the consultation could bias the responses of the caregiver or the behavior of the health worker. If the data collector is engaged in any interaction during a consultation, that observation should not be considered. A new observation questionnaire should be completed for each infant or child seen.

See DUS-2: Observation of Health Workers Data Form in the *Data Collector's Guide*.

Computation & Example: The number of health workers explaining the signs of progressive illness that would merit follow-up to patients should be divided by total number of encounters and multiplied by 100 to provide the percentage required for this indicator. Along with this average, provide range figures.

$$\text{Percentage of Health Workers Who Mentioned Any Signs of Progressive Illness and Recommended a Doctor or Clinic Visit if Those Signs Appeared} = \frac{\text{Total \# Health Workers Mentioning Signs}}{\text{Total \# Encounters}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{Percentage of Health Workers Who Mentioned Any Signs of Progressive Illness and Recommended a Doctor or Clinic Visit if Those Signs Appeared} = \frac{9}{12} \times 100 = 75.0\ \%$$

? If, for 20 health facilities surveyed, data for a sample of 223 caregiver encounters showed that a total of 181 health workers mentioned to the caregiver any signs of progressive illness and recommended a doctor or clinic visit if those signs appeared, then the average for all facilities would be calculated as follows:

$$\text{Percentage of Health Workers Who Mentioned Any Signs of Progressive Illness and Recommended a Doctor or Clinic Visit if Those Signs Appeared} = \frac{181}{223} \times 100 = 81.2\ \%$$

? If, for 20 drug retail outlets surveyed, data for a sample of 60 simulated purchases showed that 31 health workers mentioned to the caregiver any signs of progressive illness and recommended a doctor or clinic visit if those signs appeared, then the average for all drug retail outlets would be calculated as follows:

$$\text{Percentage of Health Workers Who Mentioned Any Signs of Progressive Illness and Recommended a Doctor or Clinic Visit if Those Signs Appeared} = \frac{37}{60} \times 100 = 61.7\ \%$$

Presentation: In a survey of 20 health facilities in country Z, an average of 81.2% of health workers communicated to caregivers about signs of progressive illness and

recommended a doctor or clinic visit if those signs appeared, with a range from 67% to 91% among health facilities.

In a survey conducted at 20 drug retail outlets in the same country Z, an average of 61.7% of health workers communicated to caregivers about signs of progressive illness and recommended a doctor or clinic visit if those signs appeared.

The education of caregivers is an important part of the IMCI strategy. Follow-up with caregivers will ensure that cases gain attention prior to becoming acute cases and will give the health facilities greater opportunity to reduce child mortality.

ANNEX 3. SUPPLEMENTAL INDICATORS

SUPPLEMENTAL INDICATORS

For the purpose of this manual, supplemental indicators are defined as indicators that may be helpful but are not generally essential to an understanding of the drug management system for IMCI. There are four supplemental indicators that can be used as part of the Drug Use Study. The supplemental indicators address measles, anemia, malnutrition, and the dispensing of antibiotics.

Measles and malnutrition are two of the five conditions addressed in the IMCI strategy. However, data related to measles are best collected close to the time of, or during, an epidemic to ensure an adequate sample size. This may or may not be the case at the time the Drug Use Study is conducted. Malnutrition can be difficult to diagnose and treatment is more a factor of proper nourishment than drug therapy. Anemia, while not one of the core IMCI conditions, is a problem in many countries, particularly in Africa. Therefore, indicators for measles, malnutrition, and anemia are included as optional or supplemental indicators for those countries that have identified these conditions as problems.

The accuracy of drug dispensing can be an important index of the quality of care delivered. Poor dispensing practices can contribute to higher drug therapy costs, drug errors leading to treatment failures or worsening condition of the patient, and, for the particular therapeutic class of antibiotics, the emergence of antimicrobial resistance (AMR). The last supplemental indicator is included for those countries that want to assess the quality of the dispensing of antibiotics.

21. Percentage of encounters diagnosed as measles that are prescribed vitamin A (F)

Rationale: This indicator attempts to measure the degree of compliance with IMCI treatment guidelines for measles.

Definition: A child is classified as having measles if he or she has measles at the time of the encounter or had measles within three months prior to the encounter. All measles cases, with or without complications, are included in the survey.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Identify a sample of 30 measles encounters per health facility and determine the number prescribed vitamin A. Identify encounters by consulting daily registers, patient records, prescription slips, or through observation.

Before the study, organizers should discuss, and reach consensus on, a list of local terms used to describe symptoms that may be listed in health facility records to denote cases of measles. In many countries, measles comes in epidemics. The spacing of the epidemics depends on factors like population density, mobility, and vaccination coverage. Efforts should be made first to gather the data retrospectively from medical records. Organizers should pinpoint the last epidemic in the area and make sure that the epidemic is included in the period covered by the survey. If the data are not available from records, then as an alternative, the data can be collected prospectively from observation, on the condition that a measles epidemic is taking place at the time of the survey or has taken place within three months before the survey. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.)

To collect the data from records, use the list of local terms described above to select a sample of 30 patient encounters of patients two months to five years of age, diagnosed as having measles, from each MOH health facility. All drugs prescribed should be transcribed on the data collection forms. Count the number of encounters prescribed vitamin A.

See DUS-1: Medical Records Review Form in the *Data Collector's Guide*.

Computation & Example: For each facility in a sample, the indicator is recorded as a percentage of the total number of patient encounters surveyed. The percentage is computed by dividing the number of patient encounters during which vitamin A is prescribed for measles by the total number of measles patient encounters surveyed and multiplying by 100. The overall indicators are the averages of these facility-specific percentages. Along with this average, provide range figures.

$$\text{\% of Measles Encounters Prescribed Vitamin A} = \frac{\text{Total \# of Measles Encounters Prescribed Vitamin A}}{\text{Total \# of Measles Encounters Surveyed}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{\% of Measles Encounters Prescribed Vitamin A} = \frac{12}{30} \times 100 = 40.0\%$$

? If for 20 health facilities surveyed, data for a sample of 600 patient encounters showed that a total of 496 patient encounters received vitamin A for treatment of measles, then the average for all facilities would be:

$$\text{\% of Measles Encounters Prescribed Vitamin A for All Facilities} = \frac{496}{600} \times 100 = 82.6\%$$

? A sample of 20 drug retail outlets where measles simulated purchases were conducted showed that a total of 11 patient encounters received vitamin A for treatment of measles, so the average for the 20 drug retail outlets would be:

$$\text{\% of Measles Encounters Prescribed Vitamin A} = \frac{\text{Total \# of Measles Encounters Prescribed Vitamin A}}{\text{Total \# of Simulated Purchases}} \times 100$$

$$\text{\% of Measles Encounters Prescribed Vitamin A} = \frac{11}{20} \times 100 = 55\%$$

Presentation: In a survey of 20 health facilities in country Z, vitamin A was prescribed for the treatment of measles during 82.6% of all outpatient encounters classified as having measles at the time of the encounter, or in the three months prior to the encounter, with a range of 62% to 93% among facilities. In a survey of 20 drug retail outlets in the same country Z, an average of 55% of encounters received vitamin A for treatment of measles.

22. Percentage of encounters diagnosed as anemia that are prescribed iron (F)

Rationale: This indicator attempts to measure the degree of compliance with IMCI treatment guidelines for anemia.

Definition: Iron is any form of oral iron supplement given.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Identify a sample of 30 anemia encounters per health facility and determine the number prescribed iron. Identify encounters by consulting daily registers, patient records, prescription slips, or through observation.

Before the study, organizers should discuss, and reach consensus on, a list of local terms used to describe symptoms that may be listed in health facility records to denote cases of anemia. Efforts should be made first to gather the data retrospectively from medical records. If the data are not available from records, then as an alternative, the data can be collected prospectively from observation. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.)

To collect data from records, use the list of local terms described above to select a sample of 30 patient encounters of patients two months to five years of age, diagnosed as anemia, from each MOH health facility. All drugs prescribed should be transcribed on the data collection forms. Count the number of encounters prescribed iron.

Note: Anemia encounters may be difficult to identify at the health facility level. Review four months of records, and if fewer than five cases in total have been identified, abandon the process for anemia in that facility. If more than 5 have been identified, continue the selection process for the 12-month period and stop, even if fewer than 30 encounters have been identified. The time required to review 12 months of records for a probable data set of less than 15 cases is not efficient use of the limited time available.

See DUS-1: Medical Records Review in the *Data Collector's Guide*.

Computation & Example: For each facility in a sample, the indicator is recorded as a percentage of the total number of patient encounters surveyed. The percentage is computed by dividing the number of patient encounters in which iron is prescribed for anemia by the total number of anemia patient encounters surveyed and multiplying by 100. The overall indicators are the averages of these facility-specific percentages. Along with this average, provide range figures.

$$\text{\% of Anemia Encounters Prescribed Iron} = \frac{\text{Total \# of Anemia Encounters Prescribed Iron}}{\text{Total \# of Anemia Encounters Surveyed}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{\% of Anemia Encounters Prescribed Iron} = \frac{7}{30} \times 100 = 23.3\%$$

? If for 20 health facilities surveyed, data for a sample of 600 patient encounters showed that a total of 298 patient encounters received an iron supplement for treatment of anemia, then the average for all facilities would be:

$$\text{\% of Anemia Encounters Prescribed Iron for All Facilities} = \frac{298}{600} \times 100 = 49.6\%$$

Presentation: In a survey of 20 health facilities in country Z, iron was prescribed for the treatment of anemia during 49.6% of all outpatient encounters classified as having anemia at the time of the encounter, with a range of 7% to 79% among facilities.

23. Percentage of encounters diagnosed as having very low weight for age that are counseled on feeding (F)

Rationale: This indicator attempts to measure the degree of compliance with IMCI treatment guidelines for malnutrition.

Definition: For this indicator, children identified as suffering from malnutrition are those corresponding to the *Very Low Weight for Age* classification of the IMCI protocol. "Counseled on feeding" refers to any type of nutritional counseling. In records this can be noted in detail, but often it will be noted as "advice on feeding," "diet," "regimen," etc.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Medical Records Officer/ Health Facility Manager/ Pharmacist	Identify a sample of 30 low weight for age encounters per health facility and determine the number counseled on feeding. Identify encounters by consulting daily registers, patient records, prescription slips, or through observation.

Before the study, organizers should discuss, and reach consensus on, a list of local terms used to describe symptoms that may be listed in health facility records to denote cases of very low weight for age malnutrition. Also, they should establish a list of acceptable ways of describing "counseling on feeding." This requires careful review of the IMCI classification for nutritional deficiencies. If a classification of the nutritional status is used in the country, organizers should decide which cases match the "very low weight for age" category of the IMCI algorithm. Efforts should be made first to gather the data retrospectively from medical records. If the data are not available from records, then as an alternative, the data can be collected prospectively from observation. (See description of sampling methods in Chapter 2, Selecting Data Collection Sites.)

To collect the data from records, use the list of local terms described above to select a sample of 30 patient encounters of patients two months to five years of age, diagnosed as having very low weight for age, from each MOH health facility. All drugs prescribed should be transcribed on the data collection forms, as well as all advice noted. Count the number of encounters that received advice on feeding.

Note: Very low weight for age encounters may be difficult to identify at the health facility level. Review four months of records, if fewer than five cases in total have been identified, abandon the process for very low weight for age in that facility. If more than 5 have been identified, continue the selection process for the 12-month period and stop, even if fewer than 30 encounters have been identified. The time required to review 12 months of records for a probable data set of less than 15 cases is not efficient use of the limited time available.

See DUS-1: Medical Records Review in the *Data Collector's Guide*.

Computation & Example: For each facility in a sample, the indicator is recorded as a percentage of the total number of patient encounters surveyed. The percentage is computed by dividing the number of patient encounters during which counseling on feeding is given for very low weight for age by the total number of very low weight for age patient encounters surveyed and multiplying by 100. The overall indicator is the average of these facility-specific percentages. Along with this average, provide range figures.

$$\text{\% of Malnutrition Encounters Counseled on Feeding} = \frac{\text{Total \# of Malnutrition Encounters Counseled on Feeding}}{\text{Total \# of Malnutrition Encounters Surveyed}} \times 100$$

? For example, results from one health facility are calculated as follows:

$$\text{\% of Malnutrition Encounters Counseled on Feeding} = \frac{8}{30} \times 100 = 26.6\%$$

? If for 20 health facilities surveyed, data for a sample of 520 patient encounters showed that a total of 253 patient encounters received counseling on feeding for treatment of malnutrition, then the average for all facilities would be:

$$\text{\% of Malnutrition Encounters Counseled on Feeding for All Facilities} = \frac{253}{520} \times 100 = 48.6\%$$

Presentation: In a survey of 20 health facilities in country Z, counseling on feeding was given for the treatment of malnutrition during 48.6% of all outpatient encounters classified as having malnutrition at the time of the encounter with a range of 20.5% to 86.7%.

24. Percentage of prescribed antibiotics dispensed correctly (i.e., the required quantity of medication to complete the standard course of therapy, as well as the correct drug, dosage strength, and regimen) (F/D)

Rationale: This indicator measures the percentage of IMCI antibiotics dispensed correctly. Prescriptions that are dispensed with less than the quantity of drug prescribed could imply problems with drug availability, the patient's ability to pay, or the accuracy of the dispenser. The specific reason, however, can only be identified through in-depth research that is beyond the scope of this assessment. This indicator has particular importance to the rational use of antibiotics. Taking antibiotics for less than the recommended standard course of therapy may contribute to treatment failure and promote the development of antibiotic resistance.

Definition: For a list of DMCI tracer drugs, drugs that are actually dispensed are defined as prescribed drugs that are dispensed from the health facility or drug retail outlet. In this indicator, it is based only on the prescriptions presented for dispensing.

Data Collection:

Where to Go	*Whom to Ask*	*What to Get*
20 MOH health facilities	Health facility supervisor for permission to conduct exit poll interviews	Number of antibiotics dispensed (with their quantities) and the total number of antibiotics that were prescribed in a sample of 10 to 15 IMCI dispensing encounters at each health facility, by conducting exit poll interviews.
20 Drug retail outlets	Data collection is done as a simulation. Store managers should be unaware of the process so no permission is needed.	Number of antibiotics dispensed and the total number of prescriptions for an antibiotic that were dispensed in a sample of 20 purchases.

At each of the 20 MOH health facilities, data collectors conducting the exit poll interviews for this indicator should use the same sample of caregiver encounters used for the exit poll interviews for indicators 16 and 17. Thus, the exit poll interviews for this indicator can be conducted at the same time as for indicators 16 and 17. Conduct the exit poll interviews as described in the *Data Collector's Guide*. Include only patients two months to five years of age needing curative care.

There should be at least one prescription for an antibiotic presented at each of the 20 drug retail outlets. The prescription should be for an antibiotic from the DMCI tracer list for a target condition. For example, the prescription could be for co-trimoxazole (i.e., for the treatment of pneumonia). The data for this indicator can be collected at the same time as the data collected for indicator 16. Record the drug information from the prescription presented for dispensing (i.e., the quantity of antibiotic, the name of antibiotic, the dosage strength, and regimen), and then record the same drug information about the drug actually dispensed. (To avoid confusion or the need for interpretation by data collectors, all drugs dispensed should be transcribed to the data collection forms exactly as listed on the prescription label and as verified by a physical examination of the drug dispensed.)

See DUS-3: Exit Poll Interview Form in the *Data Collector's Guide*.

Computation & Example: For each MOH health facility and drug retail outlet in the sample, the indicator is recorded as a percentage, computed by dividing the number of antibiotic drugs actually dispensed correctly by the total number of prescribed antibiotics presented for dispensing, and multiplying this quotient by 100. The overall indicator is an average of these MOH health facility and drug outlet-specific percentages. Along with this average, provide the range figures.

$$\text{\% of Prescribed Antibiotics That Are Dispensed Correctly} = \frac{\text{Number of Antibiotic Drugs Dispensed Correctly}}{\text{\# of Prescribed Antibiotic Drugs Presented for Dispensing}} \times 100$$

? The result for one MOH health facility is calculated as follows:

$$\text{\% of Prescribed Antibiotics That Are Dispensed Correctly} = \frac{8}{12} \times 100 = 66.6\%$$

? If, for 20 MOH health facilities, data for a sample of 189 exit poll interview encounters showed that 105 prescribed antibiotics were actually dispensed correctly for 125 antibiotic prescriptions presented for dispensing, then the average for all MOH health facilities would be calculated as follows:

$$\text{Average \% of Prescribed Antibiotics That Are Dispensed Correctly for All MOH Facilities} = \frac{105}{125} \times 100 = 84.0\%$$

? The results for 20 drug retail outlets are calculated as follows:

$$\%\text{f Prescribed Antibiotic Drugs that Are Dispensed Correctly} = \frac{13}{20} \times 100 = 65.0\%$$

Presentation: In country T, for a sample of 20 MOH health facilities, an average of 84% of prescribed antibiotics presented for dispensing were dispensed correctly, with a range from 58% to 94% among health facilities.

In a survey conducted through simulated purchases of 20 drug retail outlets in the same country T, an average of 65% of prescribed antibiotics presented for dispensing were dispensed correctly.

WHO TOPICAL LIST OF KEY INDICATORS FOR IMCI AT HEALTH FACILITY LEVEL

(January 1999)

Health Worker Skills

Assessment

1. Child checked for four general danger signs
2. Child checked for the presence of cough, diarrhoea, and fever
3. Child" s weight checked against a growth chart
4. Child" s vaccination status checked
5. Caretaker of child under two years of age asked about breastfeeding and complementary foods

Correct treatment and counseling

6. Child needing referral is referred
7. Child needing oral antibiotic and/or antimalarial is prescribed drug(s) correctly
8. Caretaker of sick child is advised to give extra fluids and continue feeding
9. Child leaves facility with all needed vaccinations
10. Caretaker of child who is prescribed ORS and/or oral antibiotic and/or an antimalarial can describe how to give the treatment

Health System Supports for IMCI

Supervision

11. Health facility received at least one supervisory visit during the previous four months

Drugs, equipment and supplies

12. Health facility has all essential equipment and materials for IMCI
13. Health facility has all essential IMCI drugs available
14. Health facility has the equipment and supplies to provide full vaccination services

IMCI training coverage

15. Health facilities with at least 60% of health workers who manage children trained in IMCI

Caretaker Satisfaction

16. To be determined at country level

WHO DEFINITIONS OF KEY INDICATORS FOR IMCI AT HEALTH FACILITY LEVEL

JANUARY 1999

TITLE	INDICATOR	NUMERATOR DENOMINATOR
Improved health workers' skills (for the management of children 2-59 months of age)		
ASSESSMENT	1. The proportion of children checked for the four general danger signs.	Number of sick children seen who are checked for danger signs (is the child able to drink or breastfeed, does the child vomit everything, has the child had convulsions, is the child lethargic[11]) Number of sick children seen
	2. The proportion of children checked for the presence of cough, diarrhoea, and fever.	Number of sick children seen whose caretakers were asked about the presence of cough, diarrhoea, and fever Number of sick children seen
	3. The proportion of children who have their weight checked against a growth chart.	Number of sick children seen who have their weight checked against a growth chart Number of sick children seen
	4. The proportion of children who have their vaccination status checked.	Number of sick children seen who have their vaccination card checked or who are asked their vaccination history Number of sick children seen
	5. The proportion of children under two years of age whose caretakers are asked about breastfeeding and	Number of sick children under two years of age whose caretakers are asked if they breastfeed this child and whether the child takes any other food or fluids Number of sick children under two years of age seen

[11] It may be difficult to measure whether the health worker checks for lethargy, especially if the child is awake and playing.

TITLE	INDICATOR	NUMERATOR DENOMINATOR
CORRECT TREATMENT AND COUNSELING	6. The proportion of children needing referral who are referred.	Number of sick children with a validated classification of severe disease needing referral (severe pneumonia or very severe disease, and/or severe dehydration with any other severe classification, and/or severe persistent diarrhoea, and/or very severe febrile disease, and/or severe complicated measles, and/or mastoiditis, and/or severe malnutrition or severe anaemia) who were referred Number of sick children with a validated classification of severe disease needing referral
	7. The proportion of children who do not need urgent referral, who need an oral antibiotic and/or an antimalarial who are prescribed the drugs correctly.	Number of sick children with validated classifications, who do not need urgent referral, who need an oral antibiotic and/or an antimalarial (pneumonia, and/or dysentery, and/or malaria, and/or acute ear infection, and/or anaemia in high malaria risk areas) who are correctly prescribed them, including dose, number of times per day, and number of days Number of sick children with validated classifications who do not need urgent referral, who need an oral antibiotic and/or an antimalarial
	8. The proportion of sick children whose caretakers are advised to give extra fluid and continue feeding.	Number of sick children with validated classifications, who do not need urgent referral, whose caretakers are advised to give extra fluid **and** continue feeding Number of sick children with validated classifications of diarrhoea with no dehydration
	9. The proportion of sick children who leave the HF with all needed vaccinations.	Number of sick children who leave the HF with all needed vaccinations Number of sick children seen
	10. The proportion of children prescribed ORS, and/or an oral antibiotic and/or antimalarial whose caretakers (CTs) can describe correctly how to give the treatment.	Number of sick children prescribed ORS, and/or an oral antibiotic and/or antimalarial whose CTs can describe how to give the correct treatment including the amount, number of times per day, and number of days Number of sick children prescribed ORS and/or an antibiotic and/or antimalarial

TITLE	INDICATOR	NUMERATOR DENOMINATOR
Improved health system supports for IMCI		
SUPERVISION	11. The proportion of HFs with IMCI-trained health workers (HWs) that received at least one clinical supervisory visit during the previous 4 months.	Number of health facilities with IMCI-trained HWs that received at least one clinical supervisory visit during the previous 4 months Number of health facilities with IMCI-trained health workers
	12. The proportion of HFs that have all needed equipment and materials available on the day of contact.	Number of health facilities with all needed equipment and materials (accessible weighing scale, timing device, mother's counselling card, child health cards, IMCI chart booklet, source of clean water, spoons, cups and jugs to mix and administer ORS) available on the day of contact Number of health facilities contacted
	13. The proportion of HFs that have ORS, and all first-line and pre-referral antibiotics and antimalarial available on the day of contact.	Number of health facilities with ORS, and all first-line and pre-referral antibiotics and antimalarial (as recommended in the national adaptation of the IMCI clinical guidelines) available on the day of contact Number of health facilities contacted
	14. The proportion of HFs that have the equipment and supplies to provide full vaccination services on the day of contact.	Number of health facilities that have the equipment and supplies to provide full vaccination services (functioning refrigerator or cold chain, functioning sterilyzer and needles/syringes or disposable needles/syringes, temperature chart up-to-date, and all vaccines recommended in national guidelines) available on the day of contact Number of health facilities contacted
IMCI TRAINING COVERAGE	15. The proportion of first-level health facilities with at least 60% of health workers managing children trained in IMCI.	Number of health facilities with at least 60% of health workers managing children who are trained in IMCI Number of health facilities contacted
CARETAKER SATISFACTION	16. To be determined at country level.	

ANNEX 4. SAMPLE FORMAT FOR PRESENTING DMCI INDICATOR DATA

SAMPLE FORMAT FOR PRESENTING DMCI INDICATOR DATA

Drug Availability Study Indicators

Indicator Name	Computation	Rationale	Results (example only)
1. Percentage of DMCI tracer drug products on the national drug formulary (NDF)/ essential drugs list (EDL)	Number of DMCI Drugs on the NDF/EDL x 100 Total Number of DMCI Tracer Drug Products	This indicator is a measure of the system to support IMCI. If selection is the basis for procurement, inclusion on the NDF or EDL will help to ensure availability of drugs for IMCI.	66.7%
2. Percentage of median international price paid for a set of DMCI tracer drugs that was part of the last regular MOH procurement	a) Individual drug: MOH Unit Price x 100 Median International Unit Price b) All drugs: Sum of Percentages of All Tracer Drugs Total Number of Tracer Drugs	To determine potential savings to the MOH that could be achieved with improved procurement practices.	206.0%
3. Average percentage of a set of unexpired DMCI tracer drugs available in MOH storage and health facilities	a) Each facility: Number of Tracer Drugs with Unexpired Stock x 100 Total Number of Tracer Drugs Normally Stocked b) All facilities: Sum of Average % for Each Facility Total Number of Facilities in Sample	The successful implementation of the IMCI strategy is dependent on the drugs being available. If they are not, children may not receive proper treatment.	48.0%

Indicator Name	Computation	Rationale	Results (example only)
4. Average percentage of time out of stock for a set of DMCI tracer drugs in MOH storage and health facilities	a) Each drug: Record the Number of Days Out of Stock for Last 12 Months b) All drugs: Sum Total Numbers of Days Out of Stock for Last 12 Months c) $\frac{\text{Total \# of Stock-Out Days for All Tracer Drugs}}{365 \times \text{Total \# of Tracer Drugs Normally Stocked}} \times 100$	The successful implementation of the IMCI strategy is dependent on the drugs being available.	40.5%
5. Average percentage of stock records that correspond with physical counts for a set of DMCI tracer drugs in MOH storage and health facilities	a) Each facility: $\frac{\text{Number of Stock Records with No Discrepancies}}{\text{Total Number of Records Examined}} \times 100$ b) All facilities: $\frac{\text{Sum of Average \% for Each Facility}}{\text{Total Number of Facilities in Sample}}$	To gain control over inventory and identify problems such as theft, spoilage, poor record keeping, etc.	33.7%
6. Percentage of MOH storage and health facilities visited that have a working refrigerator with freezing compartment and thermometer for vaccine storage	$\frac{\text{Total \# of Health Facilities with Working Refrigerator, Freezer, and Thermometer}}{\text{Total \# of Health Facilities Surveyed}} \times 100$	To measure the capacity to maintain an effective cold chain system.	75.0%

Indicator Name	Computation	Rationale	Results (example only)
7. Percentage of MOH storage and health facilities with up-to-date refrigerator temperature monitoring records	Yes, temperatures are recorded weekly up to most recent 30-day period. No, if more than one day has elapsed since last recorded temperature. # of "Yes" Facilities x 100 # of Facilities in Sample	To determine the efficiency of monitoring. Vaccines that are stored at improper temperatures may be damaged and no longer efficacious. Even a one-day break in recording could lead to wastage of vaccines.	65.0%

Drug Use Study Indicators

Indicator Name	Computation	Rationale	Results (example only)
8. Percentage of MOH health facilities visited with an official manual of treatment guidelines for childhood illnesses, based on WHO IMCI treatment guidelines	Number of Facilities with Manual / Number of Facilities in Sample x 100	To measure the level of access to information to promote effective care and management of sick children based on treatment guidelines adapted from WHO.	45.0%
9. Percentage of encounters diagnosed as no-pneumonia (cough or cold) that are prescribed antibiotics	Total # No-Pneumonia Encounters Prescribed Antibiotics / Total # No-Pneumonia Encounters x 100	Antibiotics should not be prescribed for a common cold or cough. This indicator will identify if practitioners are using antibiotics inappropriately and unnecessarily.	MOH: 42.2% (n=600) Drug Outlet: 70.0% (n=20)
10. Percentage of encounters diagnosed as pneumonia that are prescribed appropriate antibiotics, according to treatment guidelines	Total # Pneumonia Encounters Prescribed Appropriate Antibiotics / Total # Pneumonia Encounters x 100	To identify whether practitioners are complying with treatment guidelines.	MOH: 79.6% (n=413)
11. Percentage of encounters diagnosed as diarrhea that are prescribed ORS	Total # Diarrhea Encounters Prescribed ORS / Total # Diarrhea Encounters x 100	To identify whether practitioners are complying with treatment guidelines.	MOH: 79.3% (n=600) Drug Outlet: 45.0% (n=20)

Indicator Name	Computation	Rationale	Results (example only)
12. Percentage of encounters diagnosed as diarrhea that are prescribed antidiarrheals	Total # Diarrhea Encounters Prescribed Antidiarrheals x 100 Total # Diarrhea Encounters	To identify whether practitioners are complying with treatment guidelines.	MOH: 20.7% (n=600) Drug Outlet: 40.0% (n=20)
13. Percentage of encounters diagnosed as non-dysentery/non-cholera diarrhea that are prescribed antibiotics	Total # Non-Dysentery/Non-Cholera Diarrhea Encounters Prescribed Antibiotics x 100 Total # Diarrhea Encounters	Antibiotics should not be prescribed for simple diarrhea. This indicator will identify whether health workers are using antibiotics inappropriately and unnecessarily.	MOH: 46.8% (n=600) Drug Outlet: 70.0% (n=20)
14. Percentage of encounters diagnosed as malaria that are prescribed an appropriate oral antimalarial, according to treatment guidelines	Total # Malaria Encounters Prescribed Appropriate Antimalarial x 100 Total # Malaria Encounters	To identify whether practitioners are complying with treatment guidelines.	MOH: 78.4% (n=518) Pharmacy: 70.0% (n=20)
15. Average cost of drugs prescribed as a percentage of costs if IMCI norms for treatment were followed	a) Total Cost of All Drugs Prescribed for a Health Problem x 100 Total Cost of IMCI Drugs Recommended for the Same Health Problem b) Sum of % of Costs of All Facilities x 100 Total Number of Facilities in Sample	Based on the assumption that IMCI is the optimal cost, this indicator is useful to gain control over costs.	MOH Dia: 335% No-pne: 188% Pneu: 275% Drug Outlet Dia: 410% No-pne: 391% Pneu: 175%

Indicator Name	Computation	Rationale	Results (example only)
16. Percentage of prescribed drugs actually dispensed	Total # of Prescribed Drugs Actually Dispensed / Total # of Prescribed Drugs Presented for Dispensing x 100	To measure the ability of the health facility or drug outlet to dispense the right drug to caregivers.	MOH: 74.0% (n=155) Drug Outlet: 70.0% (n=40)
17. Percentage of caregivers who could correctly describe how to give the prescribed medication	Total # Caregivers Who Correctly Describe How to Give Medication / Total # of Caregivers Interviewed x 100	Caregivers who do not know how to give the drug properly may not successfully treat children.	MOH: 52.1% (n=194) Drug Outlet: 45.0% (n=40)
18. Percentage of encounters where health workers asked one or more clinical questions from IMCI guidelines to determine severity of health problem	Total # Health Workers Asking One or More Clinical Questions / Total # Encounters x 100	To determine whether IMCI guidelines are being followed.	MOH: 65.0% (n=285)
19. Percentage of health workers who provided basic information to caregivers on how to give the recommended drug(s)	Total # Health Workers Providing Information / Total # Encounters x 100	To determine whether IMCI guidelines are being followed.	MOH: 74.6% (n=245) Drug Outlet: 58.3% (n=60)
20. Percentage of health workers who told caregivers about any signs of progressive illness and recommended a visit to a doctor or clinic if the signs appear	Total # Health Workers Mentioning Signs / Total # Encounters x100	To determine whether IMCI guidelines are being followed.	MOH: 81.2% (n=223) Drug Outlet: 61.7% (n=60)

ANNEX 5. CENTRAL LEVEL DATA COLLECTION

CENTRAL LEVEL DATA COLLECTION

Gathering Background Information

As mentioned in Chapter 2, there are certain figures, rates, and IMCI statistics that are important to the study of IMCI drug management. Investigators should collect and record the data, shown in the following checklist, at the very outset of the work and before the start of data collection.

Background Information Checklist	Collected? (T)
Prevalence and incidence of the IMCI health problems to be studied	
Dates covered by the government fiscal year	
Exchange rates of local currency for U.S. dollars for the data collection periods	
Inflation rates for the previous five years	
National and regional population figures	
Rates of population increase	

Preparing an Overview of MOH Pharmaceutical Management Operations

To efficiently carry out the two-part study, including interpreting the results and making recommendations for supply system improvement, it is essential to have a good understanding of current drug management operations. At a minimum, this should include qualitative descriptions of major problems that affect the movement of drugs through the procurement and distribution system and the information listed in the following checklist.

MOH Pharmaceutical Management Operations Checklist	**Collected? (T)**
Numbers and distribution of MOH health facilities, pharmacies, and warehouses	
Numbers and distribution of drug retail outlets	
Numbers and distribution of drug wholesalers, distributors, and manufacturers	
Diagram showing system of drug procurement and distribution for IMCI drugs. The diagram should also include the offices responsible for managing procurement of IMCI products (by both purchase and donation), storage facilities, and health facilities.	
List of sources of IMCI drugs flowing through the distribution system, and estimated values for each source, including budgets, and contributions of donors and NGOs	
Summary of transport arrangements linking storage and health facilities. This should be as specific as possible, indicating numbers and types of vehicles available by geographic zone. If transport is through contract arrangements with parastatal or commercial agencies, describe those arrangements and indicate the budgets.	
Copy of national drug formulary/essential drugs list or total number of IMCI drug products plus total number of all drug products on the list	
Is there a system(s) for recovering the cost of drugs dispensed in MOH health facilities? Identify the systems.	
List of all brand names in the country	
Document that identifies which drugs are available at each level	

DAS-5: International Price Comparison Form

This form is used for the indicator listed below:

2. Percentage of median international price paid for a set of DMCI tracer drugs that was part of the last regular MOH procurement

Note: For those countries that have a decentralized system of drug procurement, this form can be adapted to collect price data at the MOH health facility level. During the data collector training, the instructor should provide specific instructions for the use of this form at the health facility level. In a system of centralized drug procurement, it is only necessary to collect these data at the central level.

SECTION I. DMCI Tracer Products

The data for this indicator are collected at the MOH office that is responsible for purchasing drugs. The last regular procurement price should include the cost, insurance, and freight (CIF). For the set of tracer drugs, the CIF prices for the most recent regular procurement are written in and compared with international prices.

Data Summary:

Where to Go	*Whom to Ask*	*What to Get*
MOH Procurement Unit	Officer in charge of pharmaceutical purchases	List of most recent prices paid for a set of DMCI tracer products. For each product, the records must be reviewed to determine the CIF price for each product. Tender documents and supplier invoices may be the source of prices.
Central Medical Stores	Manager or Reception Officer	
Regional Government Administration or Medical Store	Manager	
MOH health facilities	Dispenser/Pharmacist/Store-keeper	

General Instructions for Filling Out Data Forms:

Facility Name: Write the name of the health facility or warehouse in which the data are being collected.

Data Collector Code: Write your identification code. Codes will be assigned during data collector training.

Facility Type: Write the type of facility in which you collect the data, for example, warehouse, district hospital, health center, or health post.

Location: Write the name of the geographic location of the facility, usually the name of a region, province, district, city, or town.

Date: Write the date on which you collect the data. At each facility, the data should be collected in one day, if possible.

Currency Used: Write in the currency used for the price data for DMCI tracer drugs.

One U.S. Dollar: Write in the exchange rate for a U.S. dollar in the currency used.

Instructions for Filling Out Form DAS-5, Section I:

The name of each column in Section I is in **bold** below. The numbers correspond to the column numbers on the data form.

1. **Product:** The study's list of DMCI tracer products should be preprinted in *Column 1*. Each tracer product should include the generic name, dosage form, and strength.

2. **Other Names (brand or generic):** For each tracer product, write the brand or generic name of the product purchased by the MOH medical store, warehouse, or health facility.

3. **Comparison Unit:** For each tracer product, write the comparison unit being used (e.g., tab, milliliter, sachet, each).

4. **Number of Units per Pack:** For each tracer product, write the number of comparison units per pack (e.g., 1,000 tablets per pack or 100 ml per bottle).

5. **MOH Comparison Pack Price:** For each tracer product, write the MOH CIF pack price.

6. **MOH Comparison Unit Price:** For each product, write the MOH CIF unit price for the most recent regular procurement. The MOH CIF unit price is calculated by dividing the MOH pack price by the number of units per pack. For example, the unit price is the price per tablet, milliliter, or injectable. You must enter the price to four decimal places because the units involved are so small.

7. **Median International Unit Price:** For each product, write the median international unit price from the edition of the MSH *International Drug Price Indicator Guide* that corresponds with the year in which the purchases were made.

SECTION II. Vaccines (Optional)

The data for this indicator are collected at the MOH office that is responsible for purchasing drugs. For the set of tracer vaccines, the CIF prices for the most recent regular procurement are written on the form and compared with the international prices. In decentralized procurement, sales prices for tracer vaccines in each establishment should be used.

Data Summary:

Where to Go	*Whom to Ask*	*What to Get*
Expanded Programme on Immunizations Office	Officer in Charge	Review the registry to collect the most recent regular CIF price paid for DMCI tracer vaccines by MOH.

Instructions for Filling Out Form DAS-5, Section II:

The name of each column in Section II is in **bold** below. The numbers correspond to the column numbers on the data form.

1. **Vaccine:** In this column, the list of vaccines that are included in the DMCI tracer products list should be preprinted on the data form.

2. **Origin/Source of Vaccines:** For each tracer list vaccine, write the manufacturer's name and the country of origin.

3. **Comparison Unit:** For each tracer list vaccine, write the comparison unit being used (e.g., ml, vial) and the quantity of units.

4. **Numbers of Units per Pack:** For each tracer list vaccine, write the number of comparison units per pack (e.g., dose, ml).

5. **MOH Comparison Pack Price:** For each tracer list vaccine, write the MOH CIF pack price.

6. **MOH Comparison Unit Price:** For each product, write the MOH CIF unit price for the most recent regular procurement, which is calculated by dividing the MOH pack price by the number of units per pack. The unit price is the price, for example, per tablet, milliliter, or injectable. You must enter the price to four decimal places because the units involved are so small.

7. **Median International Unit Price:** For each product, write the median international unit price from the MSH *International Drug Price Indicator Guide* that corresponds with the year in which the purchases were made.

DAS-5: International Price Comparison Form [page 1 of 2]

Facility Name:	Data Collector Code:	Facility Type:	
Location:	Date:	Currency Used:	One U.S. Dollar =

SECTION I. DMCI Tracer Products

Product	Other Names (brand or generic)	Comparison Unit	Number of Units per Pack	MOH Comparison Pack Price	MOH Comparison Unit Price	Median International Unit Price
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1. Oral rehydration salts (ORS)	Regidron	Packet	100	874	874	550
2. Co-trimoxazole tab 20/100 mg						
3. Co-trimoxazole syrup 40/200 mg per 5 ml						
4. Amoxicillin tab 250 mg						
5. Amoxicillin syrup 125 mg per 5 ml						
6. Chloramphenicol IM 1000 mg in 5 ml sterile water						
7. Gentamicin IM 20 mg per 2 ml vial						
8. Benzylpenicillin 1,000,000 IU						
9. Nalidixic acid tab 250 mg						
10. Erythromycin tab 250 mg						
11. Chloroquine tab 150/100 mg base						
12. Sulfadoxine/Pyrimethamine tab 500/25 mg (Fansidar)						
13. Quinine IM 300 mg/ml						
14. Mebendazole tab 100 mg						
15. Iron folate tab 200/0.25 mg						
16. Iron suspension 20 mg/ml						
17. Gentian Violet solution						
18. Tetracycline ophthalmic ointment 1%						
19. Vitamin A drops 5000 IU/0.1 ml						

DAS-5 [page 2 of 2] | **Facility Name** | **Data Collector Code:**

Product	Other Names (brand or generic)	Comparison Unit	Number of Units per Pack	MOH Comparison Pack Price	MOH Comparison Unit Price	Median International Unit Price
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
20. Paracetamol tab 100 mg						
21. Paracetamol syrup 24 mg/ml						
22. Ringer's lactate						
23. Oral polio vaccine (OPV)						
24. Measles vaccine						
25. DPT vaccine						
26. BCG vaccine						
27. Syringe and needle						
28. Thermometer						
29. IV sets						
30. Nasogastric tubes						
31. Weighing scale						

SECTION II. Vaccines (Optional)

Product	Other Names (brand or generic)	Comparison Unit	Number of Units per Pack	MOH Comparison Pack Price	MOH Comparison Unit Price	Median International Unit Price
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1. BCG						
2. Tetanus Toxoid						
3. Yellow Fever						

DAS-5: Use with indicator 2.

ANNEX 6. DMCI DATA ENTRY AND ANALYSIS PROGRAM FOR EPI INFO

DMCI DATA ENTRY AND ANALYSIS PROGRAM FOR EPI INFO

Please note that not all of the information entered on the data collection forms will be entered in the DMCI software. For example, information from form DAS-1 is not entered because there is no analysis to be done on it. Only the summary data, in the shaded rows, is entered from form DUS-4. DAS-4 is optional, so no information from it is entered in the software.

Preparing the Data

Before using the DMCI Epi Info software (or any other software) to analyze the data collected during the survey, certain steps must be taken to clean and prepare the data. Users must also consider and understand the various units used in working with drug names and quantities. It is very important to have a clear grasp of how to count, enter, and calculate drug quantities, in order to enter the data in the software for maximum utility.

N **REMEMBER**

The data collection team manager should have ensured that all data collection forms are properly completed while still in the field. It is very helpful for the survey organizer to double-check this as early as possible. If forms are incomplete and data collection teams are still in the field, the team manager should return to the data collector and/or data collection site to complete the form. If the data are unavailable, the incomplete record should be replaced with a new record. If this is not possible, then the record (row) should be crossed off the form and not entered in the software. You must ensure that enough complete records are entered for the sample sizes to remain statistically valid. Any information left blank or unknown in the software will cause that record to be omitted from the indicator calculations.

Assigning Units to Drugs

This is the trickiest part of the data processing, and it pays to spend some time on this issue before actually starting to enter data. For each product prescribed in the survey, you will need to set up a description of the product by entering three units: Basic Unit, Strength Unit, and Dispensing Unit. With these units you will be able to more accurately describe how much of a drug was prescribed, which is important when calculating treatment costs for comparison purposes.

The units are interrelated, and you should establish the units and their quantities before entering the study data, to avoid on-the-spot decisions during data entry. On-the-spot decisions have proven to be inconsistent and may lead to inappropriate comparisons during data analysis. The following discussion will help you better understand the three units and how they are interrelated.

Basic Unit

The Basic Unit is the smallest unit in which the drug is produced or stocked.

For tablets, capsules, dragees, and similar dosage forms, the Basic Unit is a tablet (code TAB) in this program.

It is a little trickier to assign a Basic Unit for a liquid, such as a solution, suspension, or syrup, since the Basic Unit is usually expressed in relation to the Strength Unit (discussed later). In general the Basic Unit for liquids is the milliliter (code ML).

For an ampoule or vial used as a single dose container, the Basic Unit is an ampoule (code AMP). However, for ampoules or vials that contain multidoses, the Basic Unit is the milliliter (code ML).

The Basic Unit for vaccines, inhalers, and other products administered as sprays is the dose (code DOS).

For most powders, creams, and ointments the Basic Unit is best described as a gram (code GM). But if the powder is produced in a single strength packet the Basic Unit is the packet (code PAC).

The following Basic Units are available in the standard version of the DMCI software:

Code:	**Used for:**
AMP	AMPOULE, VIAL (SINGLE DOSE)
DOS	VACCINE, INHALER, SPRAY
GM	SOLID TOPICALS (CREAM, OINTMENT, POWDER)
MG	MILLIGRAM
ML	DROPS, LIQUIDS, AMPOULE, VIAL
PAC	PACKET, SACHET
PCE	SUPPLIES, EQUIPMENT
PES	PESSARIES
SUP	SUPPOSITORIES
TAB	TABLETS, CAPSULES

Strength Unit

The Strength Unit is used to express how much of the active substance the Basic Unit contains. To illustrate, for the drug amoxicillin 250 mg capsules, the Basic Unit is the capsule (code TAB) and the Strength Unit is the milligram (code MG) in this program.

For drugs with two active components, you must take the sum of the two. For example, adult cotrimoxazole contains 400 mg sulfamethoxazole and 80 mg trimethoprim, which would be expressed as 480 mg cotrimoxazole. In compound substances with more than two active substances, you take the strength of the most prominent substance.

The Strength Unit for the tablet dosage form's active substance may be expressed in milligrams (code MG), international units (code IU), mega units (code MU), or micrograms (code MCG).

For a liquid, the active substance's Strength Unit is expressed in milligrams (code MG), micrograms (code MCG) or international units (code IU). Thus, the strength of a liquid product will be expressed as Strength Unit per Basic Unit (e.g., MG/ML). For example, in the drug amoxicillin suspension 250 mg/5 ml, the Basic Unit is milliliter (code ML) and the Strength Unit is milligram (code MG).

Sometimes the active substance for liquids is expressed in millimoles (code MM), micromoles (code MCM), milliequivalents (code MEQ), or a percentage (code %).

For specific products like vaccines and inhalers the Strength Unit is best expressed as a dose (code DOS).

With powders, creams, and ointments the Strength Unit is usually expressed in milligrams (code MG) or grams (code GM).

The following Strength Units are available in the standard version of the DMCI software:

Code:	**Used for:**
DOS	SINGLE DOSE VACCINES, INHALERS, PACKETS
GM	GRAM
IU	INTERNATIONAL UNITS
MCG	MICROGRAM
MG	MILLIGRAM
ML	MILLILITER
MU	MEGAUNITS

Dispensing Unit

The Dispensing Unit is the smallest unit in which the drug is normally dispensed for the patient to take home. It is **not** the smallest unit in which the drug can be administered in a dose to the patient during treatment. It is important to note this difference.

The Dispensing Unit for tablets can be any of the following: tablet (code TAB), blister pack (code PAC), or cycle (code PAC) in the case of oral contraceptives, since all are the smallest units dispensed to a patient in health facilities.

The Dispensing Unit for liquids is the smallest container in which they are available for dispensing, often a bottle (code BOT). When you are unsure of the volume of the bottle or container, it is safest to make the Dispensing Unit equal to the Basic Unit.

The Dispensing Unit for powders, creams, and ointments is the smallest container in which they are available, such as tube (code TUB), jar (code JAR), or packet (code PAC). When you are unsure of the volume of the container, it is safest to make the Dispensing Unit equal to the Basic Unit.

The following Dispensing Units are available in the standard version of the DMCI software:

Code:	**Used for:**
AMP	VIAL, AMPOULE, FLASK
BOT	BOTTLE
GM	GRAM
JAR	JAR, POT, TIN, CAN
LIT	LITER
ML	MILLILITER
PAC	PACKET, BLISTER, CYCLE, SACHET
PCE	PIECE, UNIT
TAB	TABLET, CAPSULE
TUB	TUBE FOR CREAMS AND OINTMENTS

The Dosage Form: Dose

The Dose is the number of Basic Units to be administered to the patient each time (s)he takes the drug. Prescribers often use lay terms to describe the Dose for liquids such as drops or teaspoonsful. To standardize the entry of prescribed dosages for liquid you should use the following equivalents in ML:

drop (.05 ML)
teaspoonful (5 ML)
tablespoonful (15 ML)
cupful (200 ML)

ORS: The Special Product

The product Oral Rehydration Salts (ORS) requires special attention when recording the prescribed dosage. The drug is usually packaged as a powder for reconstitution in water, and is then administered as a liquid. Rarely, it may come as a prepared liquid ready for administration. DMCI has used ORS packets from UNICEF (with the WHO EDL formulation) as the standard. A packet contains four powders: sodium chloride 3.5 grams, potassium chloride 1.5 grams, trisodium citrate dihydrate 2.9 grams, and glucose (anhydrous) 20 grams. For ease of dosage and cost calculations when using the DMCI program, you should describe all ORS as follows:

BASIC UNIT = milliliter (code ML)
STRENGTH UNIT = milligram (code MG)
DISPENSING UNIT = milliliter (code ML)

The strength of ORS, whether it is for reconstitution as 500 or 1000 ml or already packaged as a liquid, should be expressed as 27.9 mg/ml. This was determined as follows.

$$\frac{\text{27.9 grams (total quantity of all four ingredients in a packet)}}{\text{1000 ml (the quantity most commonly used for reconstitution)}} = \text{27.9 mg/ml}$$

One scenario using ORS is illustrated in the examples below.

Examples for Recording Products in the Drug Lists

Calculating drug treatment costs can be very problematic unless drug and dosage data are recorded using systematic methods. To better understand how to record these data and enter them into the DMCI computer program drug lists, see the examples below.

Example 1: A health worker recommends 250 mg amoxicillin capsules, to be taken twice a day for ten days.

The prescribed product needs to be entered (or verified as already present) in the Drug List. If not already present, you will need to enter the following data highlighted in bold and italics:

```
 Entering Survey Information - Constituting the Product Database      p.1

Product

Product Name: AMOXYCILLIN
  Basic Pharmaceutical Unit: *TAB
  Strength Unit: *MG
  Strength (Number of Strength Units per Basic Unit): 250
  Dispensing Unit: *TAB
  Number of Basic Units per Dispensing Unit:      1.00

  Your Product is: AMOXYCILLIN 250 MG, TAB
     presented as: TAB
     of 250 MG      per TAB
     dispensed as TAB containing      1.000 Basic Units
  Enter this Product: Y
```

Once the Drug List has been updated with the drugs prescribed in the study, you will then be able to enter the specific prescribing data collected during the survey into the prescription file. You must enter the following data highlighted in bold and italics:

```
      Entering Drug Use Study Data - Prescriptions


Product Prescribed: *AMOXYCILLIN 250 MG, TAB
                    PRODEX: A

  Number of Basic Units (Quantity) in One Dose ...    1.00
  Number of Times Dose Prescribed per Day ........  2
  Number of Days of Treatment Prescribed ......... 10
  Total Number of Basic Units for Full Course of Treatment:       20.00
```

Example 2: A health worker recommends 125 mg/5 ml paracetamol syrup, one bottle of 100 ml, to be given one teaspoonful three times a day, until the bottle is finished.

If the drug has not already been entered into the Drug List, you must enter the following data highlighted in bold and italics. Remember that for liquids, strength is expressed as Strength Unit per Basic Unit. Therefore, 125 mg/5 ml becomes 25 mg/ml.

```
 Entering Survey Information - Constituting the Product Database      p.1

Product

Product Name: PARACETAMOL
  Basic Pharmaceutical Unit: *ML
  Strength Unit: *MG
  Strength (Number of Strength Units per Basic Unit): 25
  Dispensing Unit: *BOT
  Number of Basic Units per Dispensing Unit:    100.00

  Your Product is: PARACETAMOL  25 MG/ML
     presented as: ML
     of 25 MG       per ML
     dispensed as BOT containing    100.000 Basic Units
  Enter this Product: Y
```

Now enter the following prescribing data into the prescription file as highlighted in bold and italics. Remember in previous discussions that one teaspoonful is equal to 5 ML.

```
      Entering Drug Use Study Data - Prescriptions


Product Prescribed: *PARACETAMOL 25 MG/ML, ML
                    PRODEX: A

  Number of Basic Units (Quantity) in One Dose ...    5.00
  Number of Times Dose Prescribed per Day ........  3
  Number of Days of Treatment Prescribed .........  7
  Total Number of Basic Units for Full Course of Treatment:      105.00
```

Example 3: A health worker recommends ORS, to be dissolved in one liter of water, one cup to be given every hour and to finish three packets.

If the drug has not already been entered into the Drug List, you must enter the following data highlighted in bold and italics:

```
 Entering Survey Information - Constituting the Product Database      p.1

Product

Product Name: ORAL REHYDRATION SALTS 27.9 MG/ML
  Basic Pharmaceutical Unit: *ML
  Strength Unit: *MG
  Strength (Number of Strength Units per Basic Unit): 27.9
  Dispensing Unit: *BOT
  Number of Basic Units per Dispensing Unit:   1000.00

  Your Product is: ORAL REHYDRATION SALTS 27.9 MG/ML
     presented as: ML
     of 27.9 MG    per ML
     dispensed as BOT containing   1000.000 Basic Units
  Enter this Product: Y
```

Now enter the following prescribing data into the prescription file as highlighted in bold and italics. Remember in previous discussions that one cupful is equal to 200 ML.

```
      Entering Drug Use Study Data - Prescriptions

Product Prescribed: *ORAL REHYDRATION SALTS 27.9 MG/ML
                    PRODEX: A

  Number of Basic Units (Quantity) in one Dose ...   200.00
  Number of Times Dose prescribed per Day ........ 12
  Number of Days of Treatment Prescribed .........  1
  Total Number of Basic Units for Full Course of Treatment:     3000.00
```

Example 4: A health worker recommends 37.5 mg of gentamicin sulfate injection for a child weighing 15 kg, and orders the drug to be applied intramuscularly (IM) every 8 hours for 7 days. The health center stocks gentamicin sulfate injection in ampules of 80mg/2ml.

If the drug has not already been entered into the Drug List, you must enter the following data highlighted in bold and italics. Remember that for liquids (including injectables), strength is expressed as Strength Unit per Basic Unit. Therefore, 80 mg/2 ml becomes 40 mg/ml.

```
 Entering Survey Information - Constituting the Product Database      p.1

Product

Product Name: GENTAMICIN SULFATE
  Basic Pharmaceutical Unit: *ML
  Strength Unit: *MG
  Strength (Number of Strength Units per Basic Unit): 40
  Dispensing Unit: *AMP
  Number of Basic Units per Dispensing Unit:    2.00

  Your Product is: GENTAMICIN SULFATE 40 MG/ML
     presented as: ML
     of 40 MG       per ML
     dispensed as AMP containing    2.000 Basic Units
  Enter this Product: Y
```

Now enter the following prescribing data into the prescription file as highlighted in bold and italics.

```
      Entering Drug Use Study Data - Prescriptions


Product Prescribed: *GENTAMICIN SULFATE 40 MG/ML, ML
                    PRODEX: A

  Number of Basic Units (Quantity) in One Dose ...    2.00
  Number of Times Dose Prescribed per Day ........  3
  Number of Days of Treatment Prescribed .........  7
  Total Number of Basic Units for Full Course of Treatment:      42.00
```

Example 5: A health worker recommends 187,500 units of penicillin G sodium powder for injection for a child weighing 15 kg, and orders the drug to be applied intramuscularly (IM) every 6 hours for 7 days. The health center stocks penicillin G sodium powder for injection in vials of 1,000,000 units (1 MU).

If the drug has not already been entered into the Drug List, you must enter the following data highlighted in bold and italics. Because injectable products needing reconstitution may not be stable if held for application of a second dose, it is assumed that the medication remaining in the vial after the first dose will be discarded.

```
 Entering Survey Information - Constituting the Product Database      p.1

Product

Product Name: PENICILLIN G SODIUM POWDER 1 MU
  Basic Pharmaceutical Unit: *VIAL
  Strength Unit: *MU
  Strength (Number of Strength Units per Basic Unit): 1
  Dispensing Unit: *VIAL
  Number of Basic Units per Dispensing Unit:    1.00

  Your Product is: PENICILLIN G SODIUM POWDER 1 MU
     presented as: VIAL
     of 1 MU       per VIAL
     dispensed as VIAL containing    1.000 Basic Units
  Enter this Product: Y
```

Now enter the following prescribing data into the prescription file as highlighted in bold and italics.

```
      Entering Drug Use Study Data - Prescriptions


Product Prescribed: * PENICILLIN G SODIUM POWDER 1 MU, VIAL
                    PRODEX: A

  Number of Basic Units (Quantity) in One Dose ...    1.00
  Number of Times Dose Prescribed per Day ........  4
  Number of Days of Treatment Prescribed .........  7
  Total Number of Basic Units for Full Course of Treatment:      28.00
```

Selecting the Main Diagnosis

As part of cleaning and preparing the data collection forms for entry into the DMCI software, the survey organizers must mark which diagnosis the data entry person should enter when there are multiple diagnoses for a patient. This should be done by putting an asterisk (*) next to the diagnosis/symptom to be entered. Generally speaking, the diagnosis entered should be the most important one, the one that needs to be treated most urgently, or the one that necessitates specific drugs, such as antibiotics, antimalarials, etc. For example, according to the list below, for a child with a cold and diarrhea the survey organizer would put an asterisk (*) by the diagnosis "diarrhea" on the data entry form, and the data would be entered in the software as a child with diarrhea.

The survey organizers, in collaboration with local counterparts, should determine the order of precedence for IMCI conditions, when a patient has more than one diagnosis. We have suggested an order below, but it may vary with local conditions and priorities, so it should be discussed and determined before data entry begins.

In order of decreasing seriousness, we list the following IMCI conditions:

- pneumonia (very severe disease) or other ARI requiring antibiotics
- malaria (or fever in an endemic malaria area)
- diarrhea
- ARI, non-specific
- fever, non-specific

As noted above, when the study data are entered in the DMCI software, only one diagnosis is entered for each child. All of the drugs prescribed for that child are attributed to one diagnosis. If the child has multiple diagnoses, this may mean that some drugs are incorrectly attributed to a diagnosis. Using the priority ranking of disease severity described here means that the diagnoses most likely to require antibiotics (generally the more expensive products) are the diagnoses to be entered. In the case of a child with, for example, pneumonia and diarrhea, pneumonia would be entered as the more severe diagnosis and all drugs for the child, including possibly ORS, would be entered as the treatment for pneumonia.

Although this is not ideal, to-date it has not caused major problems in data analysis. In the above example, the cost of ORS would be small relative to the cost of the other drugs, and would therefore represent only a minor additional percentage of the total cost of treatment. The purpose of indicator 15 is to provide a gross indication of relative treatment costs for IMCI managers. The DMCI software does identify encounters with multiple diagnoses. When the survey data are entered and analyzed, the survey organizer can request a frequency count to determine how many encounters had multiple diagnoses. This will help to inform the survey results and determine if further analysis is necessary.

Completing Missing Prescribing Information

If prescribing information, such as dosage form, number of units, or frequency, is missing on forms DUS-1 and DUS-2, and if it is not possible to complete the forms with information from the medical records or prescribers, the survey organizer must delete that encounter from the form. Note that any information written on the data collection form based on proxies was circled. The overall number of proxy responses used to complete information missing from DUS-1 and DUS-2 should be recorded and mentioned in the final report.

Recording Whether Antibiotics Were Dispensed Correctly

If indicator 24 (percentage of prescribed antibiotics dispensed correctly, i.e., the required quantity of medication to complete the standard course of therapy, as well as the correct drug, dosage strength, and regimen) is part of the study, the survey organizer(s) must complete column 7 on data collection form DUS-3 prior to data entry. The survey organizer, using the criteria in the indicator, must note on form DUS-3 whether each antibiotic was dispensed correctly. The data entry person will then enter this information into the software.

N **REMEMBER**

In order to complete data preparation so that the data entry person can begin work, the survey organizer must have finished the following:

- Ensured that all data collection forms are complete
- Assigned units to all drugs
- Selected and marked the main diagnosis for each encounter
- Recorded whether antibiotics were dispensed correctly

Installing the Software

DMCI uses the Epi Info Version 6.04b or higher to run. Check your Epi Info version and update if necessary. Updates can be downloaded from the CDC Web site: **<http://www.cdc.gov/epo/epi/downepi6.htm>.** Earlier versions of Epi Info will not support DMCI. DMCI is Y2K compatible, on the condition that you updated your Epi Info for Y2K compatibility. If you did not update your Epi Info 6.04b, you can make it Y2K compatible with the 4bupdate.exe, available form the same Web site.

If you do not have the Epi Info software program, and do not have Web access to download the software, you may obtain copies of manuals and/or software programs in English from the following sources:

Brixton Books (North America)
716 Desire Street
New Orleans, LA 70117 U.S.A.
Phone: (504) 944-1074
Fax: (504) 947-8899
www.brixtonbooks.com
brixtonbooks@hotmail.com
(U.S. price is $16 for the manual and $3 for diskettes, plus shipping)

Brixton Books, Unit K
Station Building
Llanidloes, Powys
Wales, UK SY186EB
Phone and Fax: 44-1686-411-004
(Cost is approximately 7.50 pounds without diskettes.)

Purchase orders are accepted for orders of $150 or more. Quantity discounts offered by Brixton Books are:

Single Copy Orders

By Individuals	Full price
Bookshops	35% discount

Health Authorities and Teaching Institutions

1-4 copies	Full price
5-19 copies	35% discount
20-29 copies	40%
50-99 copies	45%
100 or more copies	50%

Institutions Working in Developing Countries

1-4 copies	Full price
5-20 copies	40% discount
More than 20 copies	50%

If your Epi Info is installed in the C:\EPI6 directory/folder, you can run the file A:\install.bat, which will install an "empty" copy of DMCI as described below. If you want to install a copy of DMCI with sample data, you should run the file A:\installx.bat.

If you want to install DMCI manually, go through the following steps:

1. For DOS users, create a directory C:\DMCI in the root directory of you computer. For Windows 95 users, create a new folder called C:\DMCI. Also, create the folders C:\DMCI\SUM, C:\DMCI\REFTXT, C:\DMCI\INDIC.

2. Unzip the A:\DMCI.ZIP file in the C:\DMCI directory/folder.

3. Ensure that Epi Info is installed in the C:\EPI6 directory/folder.

4. Unzip the A:\DMCIPRG.ZIP file in the same directory/folder as Epi Info (C:\EPI6).

Whether the DMCI program is installed manually or through the install program, you must check the following:

5. Ensure that the PATH statement in your AUTOEXEC.BAT file contains the directory/folder where Epi Info is installed, C:\EPI6. You must also manually add the directory/folder C:\DMCI to the PATH statement. The AUTOEXEC.BAT file may be in the root of the C: drive at the C:\, or in the DOS directory, or in the WINDOWS folder. You may edit the file using the DOS editor or a Windows utility such as Notepad or WordPad. These two directories can be in any position in the PATH statement, but they must both be there, separated by semi-colons.

6. Ensure that the CONFIG.SYS contains the statement FILES=60 and BUFFERS=30. You find the CONFIG.SYS file in the root of the C: drive at the C:\, in the DOS directory, or in the WINDOWS folder. Most likely, the statement was adapted automatically when you installed Epi Info. If a value greater than 60 is in the files statement, or a value greater than 30 is in the buffers statement, that is fine.

7. If you are using a Windows NT computer, you must edit the config.nt file, which is usually in C:\winnt\system32. Add the line FILES=60 to this file.

8. If you want an icon on your Windows desktop, install the DMCI icon as described in Windows.

9. After you have made changes to the AUTOEXEC.BAT and CONFIG.SYS files, you must restart the computer for the changes take effect.

You can now run DMCI. We recommend running DMCI in DOS. Restart your computer in the DOS-mode, if you are running your computer in Windows 95, 98, or NT. It is possible to run the program from a shortcut icon on your Windows desktop. You can also click on the Start button, then Run..., then double click DMCI.MNU in the C:\DMCI folder. Although DMCI runs without too many problems in Windows, you will need sufficient memory to do so, because Windows requires quite a bit of memory on its own.

One of the most frequently reported problems with running DMCI in Windows is that the DMCI Main Menu window suddenly switches from full-screen to tiled. If this happens, simply hold down the Alt key and hit the Enter key (Alt-Ent) to get the screen back to normal. Scanning too quickly through the entry screens occasionally causes the program to freeze. If it does not find enough RAM, DMCI will freeze under Windows. **Running DMCI directly from DOS prevents most of these problems**.

To run the program in DOS, restart your computer in MS-DOS mode. **At the c:\ prompt, type <CD\DMCI>, then type <DMCI> and hit Enter.** You will be in the DMCI Epi Info program. Please be sure to only run one version of DMCI at a time; do not start multiple copies of the program at once, as it will exhaust your system resources. This is also important in that all of the DMCI study data should be entered into the same copy of the software.

DMCI uses Epi Info to run, so any peculiarities you experienced with Epi Info you may also experience with DMCI. Make yourself acquainted with the way Epi Info runs, particularly if you have never worked in a DOS environment. If you are used to a Windows environment, some Epi Info features may seem strange. Get accustomed to the shortcuts through the function keys.

<**F1**> and <**Shift-F1**> display **help**, if it is available. <Shift-F1> help displays information specific to that field in the software. If you are ever confused in the software, be sure to try <Shift-F1>.

<**F2**> finds a particular record number (**Rec#**) in the file that is on screen.

<**F6**> **delete,** marks records for **deletion**, but does not remove them from the file. Deleted records have an asterisk in the lower right corner of the screen beside the record number. Pressing F6 on a deleted record removes the mark for deletion. The records are visible when you edit the file, but are not processed during analysis. This may be confusing at first. The records marked for deletion in Reference Files and Drug Lists are removed permanently every time you exit a data entry/edit session. To permanently remove records marked for deletion from the Survey Data Files, run the option “Remove deleted records” from the menu. This option permanently removes all records marked for deletion from all your data files.

<**F7**> **Rec<** Moves back to the record just before the one on the screen, if there is one.

<**F8**> **Rec>** Moves forward to the next record, if there is one.

<**F9**> **Choices** Displays codes, if any, for the current field. Epi Info marks entries that have a pop-up pick list by listing the "legal" entries at the bottom of the screen. This is easy to miss when entering data. Therefore, we marked all entries that will display a pop-up pick list when F9 is pressed with an asterisk (*) in front of the entry space.

<**F10**> **Done** Leaves the data entry program and returns to the Main Menu. From the Main Menu it takes you out of DMCI. When working in related files, like for entering the survey data, this key will finish the entering of data in the open file and take you back to the previous file each time you hit <F10>, and so on, until you come to the Main Menu. When closing a reference or data file, <F10> also re-indexes the file you just closed. You will see text scrolling by on your screen; just wait until it is finished.

<**Ctrl-N**> **New** Clears all the fields in the current record and goes to a new record, added to the file. This is useful when you have been editing records and want to continue adding new records.

If you hit any of the other function keys by mistake, use <**Esc**> to de-activate them. They are useless in DMCI and will only confuse you.

N **REMEMBER**

You should enter all of the data in one copy of the DMCI Epi Info software. If you enter data on more than one computer, it will be difficult to combine the data on one machine, which is essential to doing the analysis.

How to Empty Your Data Files

In order to obtain a "clean" copy of DMCI, i.e., a copy with empty data files, but with some of the reference files still containing useful data, proceed as follows:

1. Start DMCI.
2. Go to the first pull-down menu "Programs."
3. Choose "ENTER data."
4. Enter the name of the .REC file to empty.
5. Choose "2," which corresponds with "Create a new data file from .QES file."
6. Enter the corresponding .QES file.

7. Let the program run. For the files that relate into other files and carry over variables, you will get an error message "Variable not found." Don't pay attention to it, just proceed.

Empty your data files in the following order:
LOGISTIC.REC
THERAPY.REC
CHILD.REC
FACILITY.REC
PRODCOST.REC
DRUGLIST.REC
TRACDRUG.REC
GEO.REC
IMCICALC.REC
IMCICOST.REC
GENCOST.REC

Then run the VIRGIN.BAT file from the DOS prompt in C:\dmci. This will empty your report and summary data file directories, if they contain files.

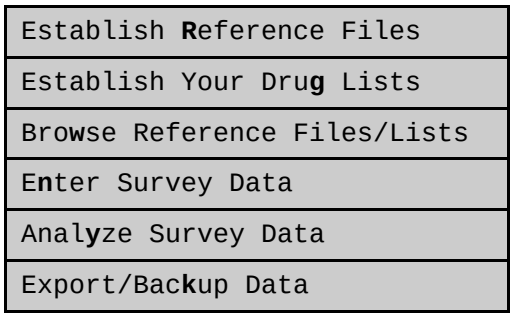
Do not run the calculations and analyses functions in Epi Info with empty data files. Doing so will corrupt the files. If the files get corrupted, you must re-install the software and restore your data files from a backup disk.

The Main Menu

When DMCI starts, it displays a window that resembles the Epi Info main menu window. DMCI is written using the "Epi Info language," which explains the similarity.

On the top of the screen you see several choices, one of which is highlighted. You can highlight another choice by clicking on it with the mouse, or by using the arrow keys. Epi Info users will recognize all of the menu items, except the second one from the left, which is the one option that interests you: "DMCI." Click the mouse here, or press <Enter> after you have highlighted it.

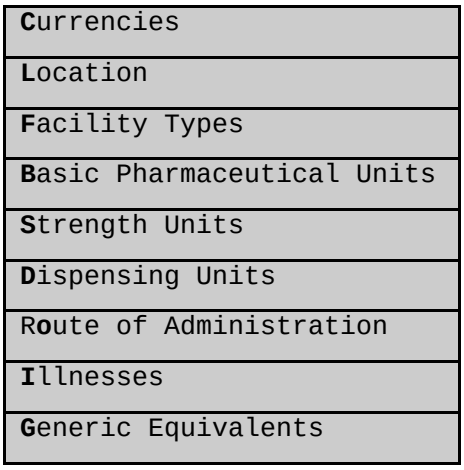
A pull-down menu appears, containing the following options:



You can highlight them or press the shortcut key, displayed in red.

Establish Reference Files

When you click on the option Establish Reference Files, the following options are displayed:



Each of these options will lead you to an entry screen for one of the reference files. A reference file contains information that needs to be entered repeatedly during the entry process. To reduce data entry errors when entering survey data, you can ask for a pop-up pick list by pressing the F9 function key, and pick the right data from that list. The lists that contain data that may change from country to country are contained in the reference files. A few pop-up pick lists that contain unchangeable information are embedded in the CHK files of DMCI. **We strongly suggest that you do not change the pop-up pick lists contained in the CHK files: It can corrupt your data and prevent the reports from being produced correctly.**

Some of the reference files already contain data, others are empty and need to be filled in. We suggest that you don't change the codes of the reference files already containing data, but rather try to fit in your own descriptions into the existing codes.

We will discuss the files, in the order in which they should be entered. We will put the names of the corresponding data files in the data dictionary between [ ]. Likewise, we will mention the corresponding field name (variable name) in the data dictionary after the name of each item of the screen between [ ]. Unless you are very familiar with Epi Info, we strongly discourage accessing the data files directly.

All of the reference files can be entered before you receive any survey data from the field. If you have done so, you can start entering data immediately after you have cleaned the DMCI data collection forms. You will get accustomed to the way the DMCI software program works while entering reference files.

When finishing a data entry session for the reference files, DMCI automatically re-indexes the contents of the reference files in alphabetical order on the code field. The amount of time this takes depends on your hardware. Epi Info will display the analysis screen during the indexing. Do not interrupt the re-indexing process; you may end up with corrupted files.

Currencies [Curr.rec]

The data entry screen looks like this:

```
                Enter Codes and Descriptions for
                  Currencies Used in the Survey


        Currency - code:

        Exchange rate to the US dollar: #######.##

        Currency – description:
```

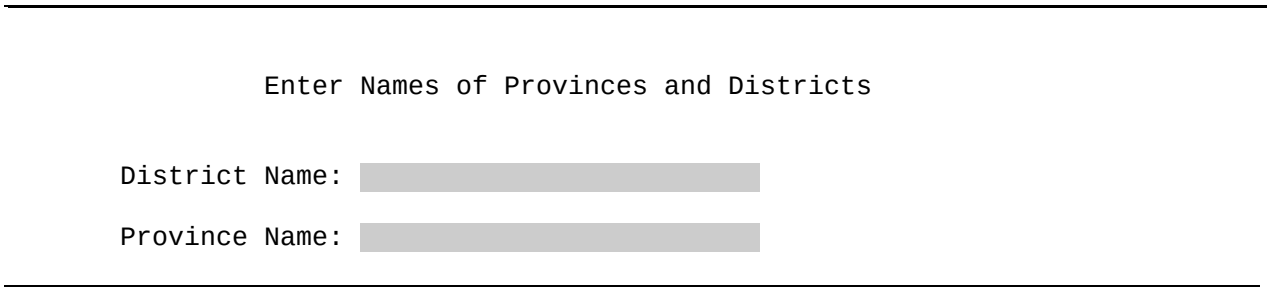
Currency code [Curr]: Enter the three letter code, used in international finance for the currency. DMCI comes with two codes entered, the USD (U.S. dollar) and the SAM (sample). Edit the SAM to be the code of your currency.

Exchange rate to the US dollar [Exch]: Enter the exchange rate of your currency against the US Dollar you want to use throughout the survey. If there were many fluctuations during the twelve months prior to the survey, take the average for that period. The rate you enter here will be automatically used for conversions throughout the program. If you want to change the rate after entering records in other files, which we discourage, you will have to edit and update each and every record already entered in that file. It is best to decide what exchange rate to use before entering data. You will notice that the rate equals 1 for the USD, and 7.35 for the SAM. Keep the exchange rate of the USD as it is and edit the exchange rate of the SAM.

Currency - description [Currdesc]: Enter the description of the currency. United States Dollar is already entered. Edit the Sample Currency to your own currency.

Location [Geo.rec]

The data entry screen looks like this:



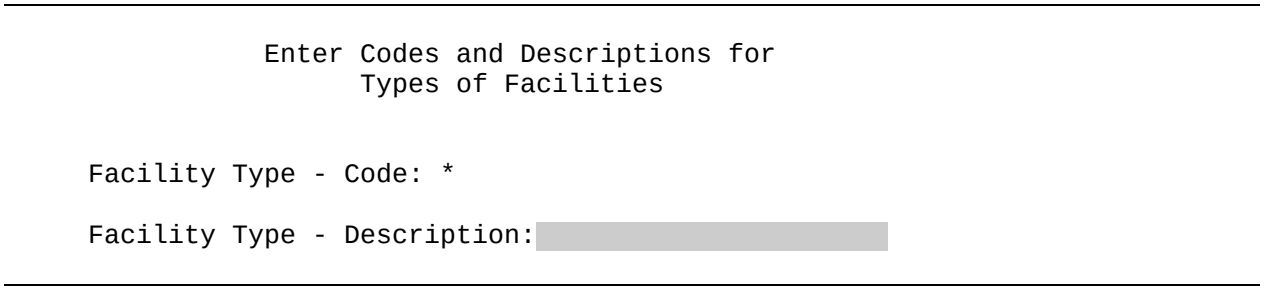
The location of each data collection site is defined by three levels: Province ÷ District ÷ Municipality. We used the names provinces and districts to designate two levels of administrative entities. You can define what they correspond with for your survey, as long as you can localize each visited facility adequately.

District name [Dist]: Enter the name of the smaller administrative unit. DMCI will not allow you to enter the same name twice for a district, even if it is not located in the same province. If you have two districts with the same name, change one letter in the name of one of them to have both names accepted by DMCI.

Province name [Prov]: Enter the name of the larger administrative unit of which the district is a part. Take care to spell each province exactly the same way when you enter it. A different spelling will be recognized as a different province by DMCI, and will prevent you from grouping results by province in the analysis.

Facility Types [Factyp.rec]

The data entry screen looks like this:



Facility Type - Code [Factype]: Enter the four letter code for the type of facility. The available codes are displayed in a pop-up when you press the F9 function key, as noted by the asterisk before the field number. You have six codes for different public sector health facilities, two codes for public sector pharmaceutical storage facilities, and one code for private sector pharmacies. Assign them as you like, but only the PRIV code can stand for the private sector pharmacies. You cannot add new codes. If you do not respect the available codes (e.g., the PRIV for private sector pharmaceutical outlets) the analysis program will not give the correct results.

Facility Type - Description [Fdesc]: Enter the description explaining each code. You can edit the descriptions to fit the facilities in your country.

Basic Pharmaceutical Unit [Basunit.rec]

The basic pharmaceutical unit is the smallest unit in which a product can be purchased, stocked, or counted. The entry screen looks like this:

```
        Enter Codes and Descriptions for
           Basic Pharmaceutical Units


      Basic Unit - code:

      Basic Unit - description:
```

Basic Unit - code [Basunit]: Enter the three letter code for the basic pharmaceutical unit of a product. We suggest leaving the file as it is and not altering the existing codes, or adding new ones. You can edit the description of existing codes to comply with your products. If you decide to add or edit codes, refer first to the section “Establishing Codes for Drug Use.”

Basic Unit- description [Basdesc]: Enter the description of what basunit stands for. One code can stand for several similar units, e.g., TAB stands for tablets, dragee, capsule, and caplet.

Strength Units [Strength]

The data entry screen looks like this:

```
                Enter Codes and Descriptions for
                        Strength Units


     Strength Unit - code:

     Strength Unit - description:
```

Strength Unit - code [Strunit]: Enter the code of up to five letters for the unit in which the strength of a basic unit of a product is expressed. We suggest leaving the file as it is and not altering the existing codes, or adding new ones. You can edit the description of existing codes to comply with your products. If you decide to add or edit codes, refer first to the section "Establishing Codes for Drug Use."

Strength Unit- description [Sdesc]: Enter the description of what strunit stands for.

Dispensing Units [Dispens.rec]

The dispensing unit is the smallest unit in which a product is given to the patient to take home. The entry screen looks like this:

```
                    Enter Codes and Descriptions for
                Dispensing Units of Drugs and Medical Supplies


          Dispensing Unit:

          Dispensing Unit description:
```

Dispensing Unit - code [Disunit]: Enter the three letter code for the smallest unit in which the product is dispensed. We suggest leaving the file as it is and not altering the existing codes, or adding new ones. You can edit the description of existing codes to comply with your products. If you decide to add or edit codes, refer first to the section "Establishing Codes for Drug Use."

Dispensing Unit- description [Bisdesc]: Enter the description of the dispensing unit.

Route of Administration [Admin.rec]

The entry screen looks like this:

```
              Enter Codes and Descriptions for
                   Route of Administration

     Route of administration - code:

     Route of administration - description:
```

Route of administration - code [Admin]: Enter the three letter code for the route of administration of the product. You cannot alter the existing codes or add new ones. You can edit the description of existing codes to comply with your products.

Route of Administration - description [Adesc]: Enter the description of what admin stands for.

Illnesses [Illness.rec]

During the preparation of the survey you established a list of illnesses/symptoms and their corresponding IMCI classification to facilitate the selection of patients or patient records by the data collectors. In this file enter all the illnesses/symptoms that are studied in the survey. The entry screen looks like this:

```
              Enter Codes and Descriptions for
              Illnesses Included in the Survey

       Illness - Description:

       IMCI Classification: *
```

Illness - Description [Idesc]: Enter the description of the illness/symptom you have accepted for the survey. DMCI will only accept each illness once. The same illness spelled differently will be recognized as a different illness.

IMCI Classification [Iclass]: Enter the code of the IMCI classification of each illness/symptom, according to the classification you established during the preparation of the survey. You can only enter predetermined codes, which are displayed in a pop-up pick list when you press the F9 function key. The same code can be entered as many times as you enter an illness that corresponds with it. Unlike many other codes, this code is used to reduce many illnesses/symptoms to the IMCI illnesses studied in the cost comparison analysis. You will end up with many different illnesses/symptoms classified as “Other.”

Generic Equivalents [Generic.rec]

A file has been established with the most commonly used generic product names. You may have to enter a few that are missing. The entry screen looks like this:

```
            Entering/editing Generic Equivalent Names

         Generic equivalent:
```

Generic equivalent [Genequi]: This is the generic name of a drug. It is also used as pop-up pick list for Druglist.rec; DMCI refuses duplicate names. You need to enter the generic name of each drug that has been recorded during the data collection process. Many of those are probably contained in the file as it is. Add the ones that are missing. You may delete the ones not used.

Establish Your Drug Lists

When you click on the option Establish Your Drug Lists, the following options are displayed:

Tracer Drug List
Sur**v**ey Drug List
Survey Drug **P**rices
IMCI Treat**m**ent Cost

Before entering any other survey data, you need to establish four more complex reference files. They will allow you to enter drugs (and other items, if you include them) through pop-up pick lists in the survey data files. You can only enter the files when you have manually cleaned and processed the raw survey data. When you work from cleaned data collection forms, you will find the entry process rather easy. Starting out with incomplete and/or uncleaned data collection forms can make the task unnecessarily tedious and complex, and require a lot of additional work cleaning out the computer data files.

Tracer Drug List [Tracdrug.rec]

This list contains the information of all the tracer items and only those. Tracer items are those items whose availability you are going to assess in the Drug Availability Study (DAS). Do not enter any DAS data until you have completely filled out the Tracer Drug List for all items you want to include. The Tracer Drug List can be entered before you receive survey data from the data collection sites. The price information is obtained at central level, from the MOH Procurement Office, or the Central Medical Stores. The entry screen contains two pages, which look like this:

```
 Entering Survey Information - Constituting the Tracer Drug Database     p.1

Product

Product Name:
  Basic Pharmaceutical Unit: *
  Strength Unit: *
  Strength (number of Strength Units per Basic Unit):

  Your Product is:
     presented as:
     of       per

  Enter this Product in your Tracer List :

  Route of Administration: *
```

```
 Entering Survey Information - Constituting the Tracer Drug Database     p.2


Product

MOH Comparison Unit Price: ######.####
                 Currency:
            Exchange Rate: ######.####

MOH Comparison Unit Price in US Dollars: ######.#### per Basic Unit

Median International Procurement Price per Basic Unit: ######.#### US Dollar

MOH Price as percentage of Median International Price: ####.## %
```

Product [Product] is a code automatically attributed once you entered "Y" after the question "Enter this Product in your Tracer List." The program actually displays the first 17 digits of the "Product Name" and a combination of "Basic Pharmaceutical Unit," "Strength," and "Strength Unit." DMCI will reject codes (and products) that are already entered. You do not enter or edit this field directly.

Product Name [Prodname]: The name of the product you want to enter. You can enter any name that describes the product, but preferably the generic product name.

Basic Pharmaceutical Unit [Basunit]: The Basic Unit code can be entered from a pop-up pick list (press F9), which displays the contents of the basunit.rec reference file. Only names listed in the reference file are accepted. Shift-F1 displays a help window explaining the code. See also the section on "Assigning Units to Drugs."

Strength Unit [Strunit]: The Strength Unit can be entered from a pop-up pick list (press F9), which displays the contents of the Strength.rec reference file. Only valid names listed in the reference file are accepted. Shift-F1 displays a help window explaining the code. See also the section on "Assigning Units to Drugs."

Strength (number of strength units per basic unit) [Strength]: Shift-F1 displays a help window explaining the number. See also the section on "Assigning Units to Drugs."

The next paragraph on the screen describes your product, its basic unit code, its strength, and strength unit based on the information you entered, then goes to the next field.

Enter this Product in your Tracer Drug List [Enttrac]: You have to enter "Y" or "N." "N" takes you back to Prodname so you can edit the information you've just entered. "Y" fills in the code in Product and takes you to the next field.

Route of Administration [Admin] can be entered from a pop-up pick list (press F9), which displays the contents of the admin.rec reference file. Only valid codes listed in the reference file are accepted.

Product [Pdt]: Automatically taken from [Product] on the first page.

MOH Comparison Unit Price [Compprice]: Entered from data collection form DAS-5, column 6.

Currency [Curr]: Enter the code of the currency, from a pop-up pick list (press F9) of the curr.rec reference file.

Exchange Rate [Exch]: Automatically entered when the currency is entered.

MOH Comparison Unit Price in US Dollars [CompUSD]: Calculated automatically from the MOH comparison unit price and exchange rate.

Median International Procurement Price per Basic Unit [Medinter]: The CIF price for one basic unit, based on the FOB price listed in the *International Drug Price Indicator Guide*. This price is always expressed in US Dollars. Entered from data collection form DAS-5, column 7.

MOH Price as percentage of the Median International Price [Percinter]: Automatically calculated from the MOH comparison unit price in US dollars and the median international procurement price. This information is used to calculate DMCI indicator 2.

Survey Drug List [Druglist.rec]

This list contains information entered on all the drugs that have been prescribed in the Drug Use Study (DUS). You can start data entry before receiving any data from the data collection sites by entering all the DMCI Tracer Drugs. Then, as data from different facilities become available and are cleaned, enter the drugs in the Survey Drug List as well. Do not enter any other DUS data from a facility until you have filled out the Survey Drug List for all items prescribed in that facility, e.g., first fill out this list, then the Survey Drug Prices. The data entry screen has two pages, which are described below.

```
 Entering Survey Information - Constituting the Product Database      p.1

Product:

Product Name:
  Basic Pharmaceutical Unit: *
  Strength Unit: *
  Strength (number of Strength Units per Basic Unit:
  Dispensing Unit: *
  Number of Basic Units per Dispensing Unit: ######.###

  Your Product is:
     presented as:
     of          per
     dispensed as    containing ######.###
 Basic Units
  Enter this Product: Y

  Route of Administration: *

  Generic Name: *
```

```
 Entering Survey Information - Constituting the Product Database      p.2

Product:

Is the Product
  Generic ........... Y
  Injectable ........ Y
  ORS ............... Y
  Antibiotic ........ Y
  Antidiarrheal ..... Y
  Antimalarial ...... Y
  Vitamin A ......... Y
  Iron Supplement ... Y

  On the NDF/EDL ............ Y
  On the IMCI Product List .. Y
```

On the first page of the entry screen we have:

Product [Product]: A code automatically attributed once you entered "Y" after the question "Enter this Product." DMCI will reject codes that are already entered. You do not enter or edit this field directly.

Product Name [Prodname]: The name of the product you want to enter. You can enter any name that describes the product.

Basic Pharmaceutical Unit [Basunit]: The basic unit code can be entered from a pop-up pick list (press F9), which displays the contents of the basunit.rec reference files. Only valid codes are accepted. Shift-F1 displays a help window explaining where to find the code. See also the section on "Assigning Units to Drugs."

Strength Unit [Strunit]: The strength unit code can be entered from a pop-up pick list (press F9), which displays the contents of the strength.rec reference file. Only valid unit names are accepted. Shift-F1 displays a help window explaining where to find the code. See also the section on "Assigning Units to Drugs."

Strength (number of strength units per basic unit) [Strength]: Entered manually from the data collection forms.

Dispensing Unit: This can be entered from a pop-up pick list (press F9), which displays the contents of the dispens.rec reference file. Only valid names are accepted. Shift-F1 displays a help window explaining the codes. See also the section on "Coding Drug Units."

Number of Basic Units per Dispensing Unit [Basdis]: This is entered manually. This information is important for cost analysis.

The next paragraph on the screen describes your product, its basic unit code, its strength and strength unit, its dispensing unit, and the number of basic units per dispensing unit.

Enter this Product [Entprod]: You have to enter "Y" or "N." "N" takes you back to Prodname so you can edit the information you've just entered. "Y" fills in the code in Product, which is checked for duplicates. If a duplicate code is found in the Product list, you will have to re-enter your product. If the product is accepted by the program, you can go to the next entry.

Route of administration [Admin]: The route of administration can be entered from a pop-up pick list (press F9) displaying the contents of the admin.rec reference file. Only valid names are accepted.

Generic Name [Genequi]: This can be entered through a pop-up pick list (Shift F9) displaying the contents of the generic.rec reference file. Only valid names are accepted. One can have several drugs with the same generic name in the druglist.rec.

On the second page of the entry screen, some details of the product are specified by questions you answer with "Y" or "N." All questions have to be answered; the codes are used to calculate indicators.

Product [Pct]: displays the code of the product

Generic [Generic]: "Y" if the product is a generic product

Injectable [Injec]: "Y" if the product is an injectable product

Antibiotic [Antib]: "Y" if the product is an antibiotic

Antidiarrheal [Antid]: "Y" if the product is an antidiarrheal

Antimalarial [Antim]: "Y" if the product is an antimalarial

Vitamin A [Vita]: "Y" if the product is a vitamin A preparation

Iron supplement [Iron]: "Y" if the product is an iron supplement

On the NDF/EDL [Onedl]: "Y" if the product is found on the NDF or the EDL

On the IMCI Product List [Imcil]: "Y" if the product is on your country's IMCI product list

Survey Drug Prices [Prodcost.rec]

The Survey Drug Prices are the prices collected for each item prescribed at different private outlets - at least three for each item. DMCI will calculate an average price for each item based on the prices you collected.

This file contains the retail prices obtained from different private outlets and recorded on form DUS-1. For each item entered in the Survey Drug List, enter three or more prices. This file uses druglist.rec as a look-up table: you can only enter data for products entered in druglist.rec. Once you have entered the prices, DMCI automatically calculates a mean price for each product (using the brand name) and puts it into the drug list file (druglist.rec). This mean price will be used to calculate the cost of each individual treatment prescribed in the survey. DMCI will also calculate a mean price per generic product included in the IMCI product list, based on the prices you entered for each brand name that corresponds with the prescribed product, and put it into gencost.rec. This mean price will be used to calculate the average cost of the recommended standard treatment for the IMCI illnesses you investigate for cost comparison (indicator 15). The entry screen looks like this:

```
Entering Survey Information - Prices in the Survey Drug List


Product: *
Basic Pharmaceutical Unit: *

        Packing Unit: *
        Basic Units/Packing Unit: ####.##

        Price/Packing Unit: #####.####
        Price/Basic Unit: #####.####

        Currency: *
        Exchange Rate: #######.##
        Sales Price in US Dollars: ######.#### per Basic Unit

    Checked price: Y ("Y" to enter above costs, "N" to edit above costs)
```

Product [Product]: Entered from pop-up pick list (press F9) displaying the contents of druglist.rec. Specific help is available through Shift-F1.

Basic Pharmaceutical Unit [Basunit]: Entered from pop-up pick list displaying the contents of basunit.rec.

Packing Unit [Packinguni]: Description of the smallest packing size in which the drug is sold. For liquids, this is often equal to the dispensing unit. For tablets and similar items, this may be a box, a strip, a blister, a bottle, etc.

Basic Units/Packing Unit [Basicunits]: The number of basic units in one packing unit.

Price/Packing Unit [Pricepacki]: Price in local currency of one packing unit.

Price/Basic Unit [Pricebasic]: Automatically calculated from the unit price and basic units.

Currency [Curr]: Entered from pop-up pick list (press F9) displaying contents of the curr.rec reference file.

Exchange Rate [Exch]: Automatically entered when the currency is entered.

Sales price in US dollar [Salusd]: Automatically calculated from the price per basic unit and exchange rate.

Checked price [Checkprice]: “Y” takes you to the next entry, “N” allows you to edit the information you’ve just entered.

IMCI Treatment Cost

This option leads you to two further options, which have to be chosen in order of appearance: "Enter Your Survey Prices" and "Calculate Treatment Costs." The first option is:

Enter Your Survey Prices [IMCIcalc.rec]

You can enter this file once you have entered all the prices for the different products you encountered in the survey. It allows you to enter drugs used in the standard treatments of the four IMCI classifications used for the cost comparison: diarrhea, no-pneumonia ARI, pneumonia ARI, and uncomplicated malaria. If you did not establish the standard treatments allowed in your program during the survey preparation, do it now before proceeding. A standard treatment for the purpose of DMCI is the full treatment given to a 24-month-old child who is diagnosed with one of the four illnesses.

It is possible to have more than one standard treatment for an IMCI classification, e.g., no-pneumonia ARI can be treated with a soothing cough medicine only, or with a soothing cough medicine and an antipyretic. Furthermore, the drugs for each standard treatment of that same no-pneumonia ARI can come in several different forms (e.g., tablets or syrup, adult or pediatric) that have different unit prices. Although you can decide to only accept one form for the purpose of the survey, DMCI allows you to enter each of the forms and calculate a weighted average of the price, **on the condition you also give the approximate percentage of cases** that will get that form of the drug (see below). The entry screen looks like this:

```
   Entering Costs of IMCI Standard Treatments (Child of 24 Months)

IMCI Classification: *< >  Illness Description: *< >
How many drugs will you enter for this treatment: #

Name Drug 1: <                        >
Cost per Basic Unit 1: ######.#### USD
Total Number of Basic Units for Complete Treatment Drug 1: #######.##
Treatment Cost Drug 1: ######.#### USD

Name Drug 2: <             >
Cost per Basic Unit 2: ######.#### USD
Total Number of Basic Units for Complete Treatment Drug 2: #######.##
Treatment Cost Drug 2: ######.#### USD

Name Drug 3: <                        >
Cost per Basic Unit 3: ######.#### USD
Total Number of Basic Units for Complete Treatment Drug 3: #######.##
Treatment Cost Drug 3: ######.### USD

Total Cost Standard Treatment: ######.#### USD
Estimated Percent of Cases with this Treatment: ### %
```

IMCI Classification [Iclass]: Entered from a pop-up pick list displaying the IMCI classifications included in the survey.

Illness Description [Idesc]: Entered automatically when the IMCI classification is entered.

How many drugs will you enter for this treatment [Howmany]: The number of different drugs included in this standard treatment (never more than 3, according to the IMCI treatment protocols). If you enter “1”, the cursor will jump to the percentage of cases at the bottom of the screen after you entered the number of units for the first drug, preventing entering more than one drug. If you enter “2”, the cursor will jump to the bottom of the screen after you entered the number of units for the second drug, preventing entering more than two drugs. If you enter “3” you will be allowed to enter three drugs.

Name Drug 1 [Namedr1]: Entered from a pop-up pick list displaying the generic products (Gencost.rec) and their unit prices in USD.

Cost per Basic Unit 1 [Costbas1]: Entered automatically when name drug 1 is entered.

Total Number of Basic Units for Complete Treatment Drug 1 [Totbas1]: From the list of your standard treatments, the number of basic units of this product needed for a child of 24 months to complete a course of treatment. This number is used to calculate the cost of treatment for this particular drug (Trcost1), as well as the cost of one complete standard treatment

(Totcost), and, later, the average cost of a standard treatment for this illness (Costusd in the Imcicost.rec).

Treatment Cost Drug 1 [Trcost1]: Cost of treatment for this particular drug, automatically calculated by multiplying the number of units for the first drug with cost per basic unit 1.

The same data is entered for Drug 2 and Drug 3, on condition that you specified that many drugs to enter.

Total Cost Standard Treatment [Totcost]: Automatically calculated as the sum of Trcost1 + Trcost2 + Trcost3.

Estimated Percent of Cases with this Treatment [Percas]: The estimated percentage of all cases with this illness that will get the standard treatment you just entered. If you adhere to only one standard treatment schedule per illness and do not choose to allow for the different presentation forms of the drugs, this will be 100%. In all other cases, you will have to estimate and fill in a number less than 100%. If you enter less than 100%, DMCI will remind you on exiting the screen that you should enter another standard treatment for the same illness.

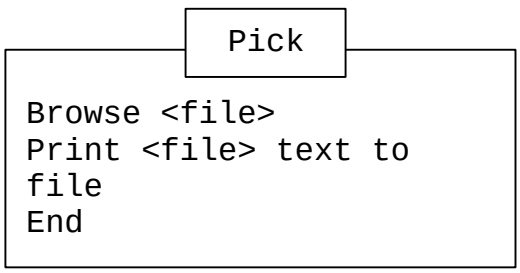
Calculate Treatment Costs [Imcicost.rec]

When you choose this option, DMCI automatically calculates an average standard treatment cost for the four IMCI classifications included in the cost analysis. DMCI first checks whether the percentages you entered in the Entering Costs of IMCI Standard Treatments screen add up to 100 for each IMCI illness included in the cost analysis. If not, it will allow you to browse which percentage is too low or too high, and then go back and edit it.

Once calculated, DMCI allows you to browse the average standard treatment cost for each of the illnesses. This cost will then be used to calculate the indicator on the cost comparison between the recommended standard treatment and the treatments actually prescribed in the survey (indicator 15).

Browse Reference Files/Lists

This option displays most of the reference files and drug lists you entered. Choosing one of the files calls up the Epi Info analysis screen, with a pick list that looks like this:



The <file> stands for the file name you want to choose.

"Browse <file>" calls up the Epi Info BROWSE screen: you can scroll through the file vertically and horizontally. You cannot edit the contents.

"Print <file> to textfile" seemingly does nothing, but in fact sets up the file to have its contents, or part thereof, printed to a TXT text file. The TXT file gets printed when you hit "END" after you hit "Print <file> to textfile." The TXT file carries the same name as the corresponding REC file. All text files printed through this option are found in the directory/folder C:\DMCI\REFTXT. You can further edit them with your favorite word processing program. The larger files (Druglist.rec and Tracdrug.rec) have only key information printed into the text file.

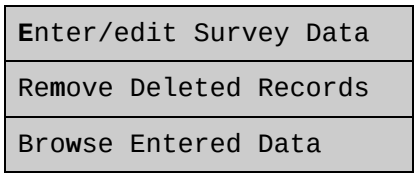
When you choose "END" after choosing "Print <file> to textfile," the corresponding text file is printed. Choosing "END" a second time brings you back to the menu.

Enter Survey Data

N **REMEMBER**

Occasionally records are randomly marked for deletion. It is vital that all records are checked to ensure that none are inadvertently marked for deletion. Unmark those records that should not be marked for deletion before any records are permanently deleted. In order to check if a record has been marked for deletion, look at the bottom right corner of the screen. Record numbers with an asterisk (*) are marked for deletion. In order to unmark for deletion push F6; make sure the asterisk (*) disappears. This must be checked before exiting the data entry/edit session. Records marked for deletion are permanently removed every time you exit a session, or when you run the "Remove deleted records" option.

Choosing this option takes you to the following menu:



Enter/Edit Survey Data

Choosing this option takes you to the entry screen of the facility. There is one such screen for each facility. From the facility entry screen, one option takes you to the Drug Availability Study screen, another option takes you to the Drug Use Study entry screen. If you find blanks on data collection forms, discuss them with the study organizer. These records should be omitted.

Entering General Survey Information [Facility.rec]: The Facility Information screen has two pages, which look like this:

```
           Entering Survey Data - Facility Information              p.1

  Facility Code
  Facility Name
  Facility Type *

  Municipality:
  District:    *
  Province:    *

  Date of visit: dd/mm/yyyy

Are the following available at this facility:
  Standard Treatment Manual:    If available, from which year: ####
  IMCI Guidelines:
  Working Refrigerator (Freezer Compartment & Thermometer):
  Up-to-date Refrigerator Temperature Monitoring Records:
```

```
           Entering Survey Data - Facility Information           p.2

Entering data for:

  Facility Code
  Facility Name
  Facility Type

Inventory data was collected from:   Computer .......
                                     Stock Cards ....
                                     Tally Sheets ...
                                     Manual Ledger ..


Enter/Edit Drug Availability Study data now: Y
           Drug Use Study data now:  Y
```

Facility Code [Faccode]: A two letter code uniquely identifying each facility. DMCI will not accept duplicate codes. Take the code from the data collection forms. If no code is available, choose a code and write it on all the data collection forms (DAS and DUS) of that facility.

Facility Name [Facname]: The name of the facility, taken from the header in the data collection sheets.

Facility Type [Factype]: The type of the facility, can be entered from a pop-up pick list (press F9) displaying the contents of the factyp.rec reference file.

Municipality [Muni]: The city, town, village, or hamlet where the facility is located.

District [Dist]: This can be selected from a pop-up pick list (press F9) displaying the contents of the geo.rec reference file.

Province [Prov]: This is automatically entered when district is entered.

Date of visit [Visit]: The date when the facility was visited, taken from data collection form DUS-1.

Standard Treatment Manual [Stm]: Possible answers: "Y" if one is available, "N" if none is available, "X" if the information is missing from the data collection form DUS-1.

From which year [year]: The year is taken from data collection form DUS-1.

IMCI guidelines [Imciguid]: Possible answers: "Y" if one is available, "N" if none is available, "X" if the information is missing from data collection form DUS-1.

Working refrigerator [Refrig]: Possible answers: "Y" if one is available, "N" if none is available, "X" if the information is missing from data collection form DAS-2.

Up-to-date Refrigerator Temperature Monitoring Records [Tempmon]: Possible answers: "Y" if one is available, "N" if none is available, "X" if the information is missing from data collection form DAS-2.

The facility identification (code, name, and type) is repeated on top of page 2.

Computer [Comp]: Possible answers: "Y," "N," or "X" if the information is missing from data collection form DAS-2.

Stock Cards [Stcards]: Possible answers: "Y," "N," or "X" if the information is missing from data collection form DAS-2.

Tally Sheets [Tally]: Possible answers: "Y," "N," or "X" if the information is missing from data collection form DAS-2.

Manual ledger [Manled]: Possible answers: "Y," "N," or "X" if the information is missing from data collection form DAS-2.

Enter/edit Drug Availability Study data now [Dasdata]: "Y" will take you to the entry screen for the information on the DAS. "N" will take you to the next entry. Only enter "Y" when you have completed your Tracer Drug List and cleaned the collected data for this study. After entering the Availability Data, you will have to enter "N" to proceed to the Drug Use Data entry.

Enter/edit Drug Use Study data now [Dusdata]: "Y" will take you to the entry screen for the information on the DUS. "N" will take you to the next record. Only enter "Y" when you have completed and cleaned the data collection forms of the facility you are entering. After entering the Use Data, you will have to enter "N" to proceed to the next record.

Entering Drug Availability Study Data [Logistic.rec]

This entry screen looks like this:

```
              Entering Drug Availability Study Data

Facility Code: ____  Facility Name: ____________________________________
Facility Type: ____

  Product: *____________________________________
           PRODEX:____________________________________

  Record Count:    #########
  Adjusted Total:  #########
  Physical Count Non-expired Stock: #########
                 Expired Stock:     #########
                 Non-expired Stock is Available: Y

  Discrepancy between Adjusted Total and Physical Count: #########
           Records and Physical Count are Corresponding: Y

  Total Days Out of Stock: ###
  Percent Time Out of Stock during the Year: ###.##
```

Facility Code [Faccode]: Carried over from facility.rec.

Facility Name [Facname]: Carried over from facility.rec.

Facility Type [Factype]: Carried over from facility.rec.

Product [Product]: This is entered from pop-up pick list displaying the contents of the tracer drug list. Specific help can be obtained through Shift-F1.

PRODEX [Prodex]: A unique code for each tracer drug in each facility, created through a combination of the facility code and product. DMCI rejects double entries for this code.

Record Count [Rcount]: This is taken from data collection form DAS-2, *Column 3*. Specific help can be obtained through Shift-F1.

Adjusted Total [Atotal]: Taken from data collection form DAS-2, *Column 6*. Specific help through Shift-F1.

Physical Count [Pcount]: Taken from data collection form DAS-2, *Column 7*. Specific help through Shift-F1.

Expired Stock [Estock]: Taken from data collection form DAS-2, *Column 8*. Specific help through Shift-F1.

Non-expired Stock Available [Nonexpired]: This will automatically become "Y" if the physical count is greater than 0.

Discrepancy between Adjusted Total and Physical Count [Discrep]: Automatically calculated from the adjusted total and physical count.

Records and Physical Count are Corresponding [Corres]: This will automatically become "Y" if the adjusted total equals the physical count.

Total Days Out of Stock [Totout]: Stock-out days is taken from data collection form DAS-3, last column. Specific help through Shift-F1.

Percent of Time Out of Stock during the Year [Percout]: This will be automatically calculated from total days out of stock.

Entering Drug Use Study Data - Encounters [Child.rec]

This screen allows entry of the data related to each encounter. The data can be obtained through a review of patient records, through observation of consultations or through simulated purchases. At the bottom of the screen is a question concerning prescriptions, which allows you to proceed to the entry screen for prescription data. If you have not cleaned the prescription data, it is possible to enter the other data first. The screen looks like this:

```
              Drug Use Study - Encounter Data

Facility Code:          Facility Name:
Facility Type:
Data Source:          Date of Consultation: mm/dd/yyyy

Patient No.:       Child Code:          Child Age in Months: ##
Child Gender:      Selected for: *

Did the provider
  Ask a significant question to assess severity of illness:
  Provide any information about administering the drug: ..
  Give any advice on progressive illness: ................
  Give any counseling on feeding: .......................

Main Diagnosis: *
IMCI Classification:          Total Number of Diagnoses: #

Enter/Edit prescriptions now:  Y
Can Patient describe how to take all the medicine:
```

Facility Code [Faccode]: Carried over from facility.rec.

Facility Name [Facname]: Carried over from facility.rec.

Facility Type [Factype]: Carried over from facility.rec.

Data Source [Data]: Two valid entries are allowed. “P” stands for Patient Records, for data taken from DUS-1, and will skip the questions related to observation or simulated purchase. “O” stands for Observation, for data taken from DUS-2 and DUS-4, and will allow the questions related to observation and simulated purchase to be answered.

Date of Consultation [Datecons]: The date the encounter took place.

Patient No. [Patno]: This is taken from data collection form DUS-1, *Column 1* or DUS-2, header. For DUS-4, always enter “01.” Specific help can be obtained through Shift-F1.

Child Code [Ccode]: This is a unique code for each child included in the survey, automatically created by the software through a combination of the facility code and patient number.

Child Age in Months [Cage]: Taken from data collection form DUS-1, *Column 2* or DUS-2, header. For DUS-4 always enter “24.” Specific help through Shift-F1.

Child Gender [Cgend]: Taken from data collection form DUS-1, *Column 3* or DUS-2, header. For DUS-4, always enter “M.” Specific help through Shift-F1.

Selected for [Selfor]: This is taken from data collection form DUS-1, header (selected for); DUS-2, header (reason for consultation); or DUS-4, title. Specific help through Shift-F1.

The following four entries are skipped if Data = "P"

Ask a significant question to assess severity of the illness [Quesass]: Taken from data collection form DUS-2, row 1 or DUS-4, row 1. Specific help through Shift-F1.

Provide any information about administering the drug [Infoadm]: Taken from data collection form DUS-2, part C or DUS-4, *Column 5*. Specific help through Shift-F1.

Give any advice on progressive illness [Advprogr]: Taken from data collection form DUS-2, row 3 or DUS-4, row 3. Specific help through Shift-F1.

Give any counseling on feeding [Feed]: taken from data collection form DUS-2, part A, item number 6 or DUS-4, Question 3. Specific help through Shift-F1.

Main Diagnosis [Diag]: The main diagnosis is taken from data collection form DUS-1, column 4; DUS-2, header; or DUS-4, title. In all cases, it should be entered through a pop-up pick list (press F9 to access) displaying the contents of the illness.rec reference file. If only one diagnosis/symptom is listed on the form for a patient, enter that diagnosis/symptom. If more than one diagnosis/symptom is listed on the data collection form, you should enter the diagnosis/symptom that was marked with an asterisk (*) by the survey organizer as part of preparing the data. See the Preparing the Data section at the beginning of the Annex for details. Specific help can be obtained by pressing Shift-F1.

IMCI Classification [Iclass]: Automatically entered when the diagnosis is entered. You do not enter or edit this field directly.

Total Number of Diagnoses [Numbdiag]: This is taken from data collection form DUS-1, *Column 4*; DUS-2, header; or DUS-4, title. Enter the total number listed for this patient, including the main one. The number of diagnoses can not be less than "1." If the child was not ill, you should have an entry for that in your illnesses file. Specific help through Shift-F1.

Enter/edit prescriptions now [Prescrip]: "Y" will take you to the entry screen for prescriptions/recommended medicine. "N" will take you to the next entry. Enter "Y" only if you have entered all the drugs encountered for this facility into the druglist.rec reference file and if you have manually cleaned and completed the prescription data for all encounters in this facility.

Can Patient Describe How to Take All the Medicine [Descr]: The response for this is taken from data collection form DUS-3, row 2. Specific help can be obtained through Shift-F1.

Entering Drug Use Study Data - Prescriptions [Therapy.rec]

This entry screen allows entry of the information regarding the prescribed and/or dispensed medicine. Do not start entering the data before you have thoroughly checked data collection forms DUS-1 and DUS-2 for completeness and exactness of the information related to the prescribed medicine (see section “Preparing the Data”).

```
      Entering Drug Use Study Data - Prescriptions

Facility Code:          Facility Name:
Facility Type:        Child Code:

Product Prescribed: *
                    PRODEX:

  Number of Basic Units (Quantity) in one Dose ... ####.##
  Number of Times Dose prescribed per Day ........ ##
  Number of Days of Treatment Prescribed ......... ##
  Total Number of Basic Units for Full Course of Treatment: ########.##

   Enter the data above: Y

Product dispensed: Y
Product dispensed correctly: Y
```

Facility Code [Faccode]: Carried over from facility.rec.

Facility Name [Facname]: Carried over from facility.rec.

Facility Type [Factype]: Carried over from facility.rec.

Child Code [Ccode]: Carried over from child.rec.

Product [Product]: Entered from pop-up pick list (press F9) displaying the contents of the druglist.rec reference file. Specific help through Shift-F1.

PRODEX [Prodex]: Unique code for each prescribed drug for each child is generated automatically through the combination of a child code and product. DMCI rejects double entries.

Number of Basic Units (Quantity in one Dose) [Qdose]: This data is taken from data collection form DUS-1, *Column 9*; DUS-2, Table 2, *Column 2*; or DUS-4 section B, *Column 2*. Specific help can be obtained through Shift-F1.

Number of Times Dose Prescribed per Day [Tdose]: This is taken from data collection form DUS-1, *Column 10*; DUS-2, Table 2, *Column 3*; or DUS-4 section B, *Column 3*. Specific help can be obtained through Shift-F1.

Number of Days of Treatment Prescribed [Ndays]: This data is taken from data collection form DUS-1, *Column 11*; DUS-2, Table 2, *Column 4*; or DUS-4, section B, *Column 4*. Specific help through Shift-F1.

Total Number of Basic Units in Course of Treatment [Totbas]: Automatically calculated from the quantity in one dose times the number of doses a day times the number of days. This number will be used to compare actual treatment costs with theoretical IMCI standard treatment costs.

Enter the Data Above [Entdata]: Answer yes (Y) to continue the data entry. Answer no (N) to edit the data you have just entered.

Product Dispensed [Dispensed]: This information is taken from data collection form DUS-3, *Column 6*.

Product Dispensed Correctly [Discorrect]: This information is taken from data collection form DUS-3, *Column 7*. After hitting return, the screen will automatically clear for entry of the next drug for the same child. All drugs for each encounter should be entered.

Remove Deleted Records

This option permanently removes all records marked for deletion from your data files. Once removed permanently, you will not be able to retrieve the data contained in the removed records. **Only use this option when you want to permanently remove the records marked for deletion from all your data files.**

It also re-indexes your data files as follows:

- Facility.rec alphabetically according to the Faccode field
- Logistic.rec alphabetically according to the Faccode and Product field
- Child.rec alphabetically according to the Ccode field
- Therapy.rec alphabetically according to the Ccode and Product field

Browse Entered Records

This option lets you choose which of the survey data files you want to browse:

- Facilities displays facility.rec, showing what you entered under “Entering General Survey Information”
- Availability displays logistic.rec, showing what you entered under “Entering Drug Availability Study Data”
- Encounters displays child.rec, showing what you entered under “Entering Drug Use Data – Encounters”
- Prescriptions displays therapy.rec, showing what you entered under “Entering Drug Use Data – Prescriptions”

Analyze Survey Data

When you click on the option Analyze Survey Data, the following options are displayed:

Drug **A**vailability Study Indicators (2-7)
Drug **U**se Study Indicators (8-20)
A**d**ditional Information

Drug Availability Study Indicators (2-7)

Choosing this option calls a pull-down menu that lists all indicators from indicator 2 through indicator 7. Choosing an indicator calls an Epi Info program file that calculates the indicator and puts the results in an ASCII text file, which carries the name of the indicator. For example, by choosing "Indicator 2," a program will calculate the indicator from the data you entered, and put the results in a file called INDIC2.TXT. You can read and edit the TXT file in your favorite word processing program.

Drug Use Study Indicators (8-20)

Choosing this option calls a pull-down menu that lists all indicators from indicator 8 through indicator 20. Choosing an indicator calls an Epi Info program file that calculates the indicator and puts the results in an ASCII text file, which carries the name of the indicator. For example, by choosing "Indicator 8," a program will calculate the indicator from the data you entered, and put the results in a file called INDIC8.TXT. You can read and edit the TXT file in your favorite word processing program.

Additional Information

Additional Indicators

Choosing this option calls a pull-down menu that lists all indicators from indicator 21 through indicator 23. Choosing an indicator calls an Epi Info program file that calculates the indicator and puts the results in an ASCII text file, which carries the name of the indicator. For example, by choosing "Indicator 21," a program will calculate the indicator from the data you entered, and put the results in a file called INDIC21.TXT. You can read and edit the TXT file in your favorite word processing program.

Create Availability Summary

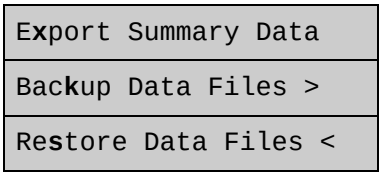
This option calls an Epi Info program file that constructs a data file, DASINFO.REC, for further customized analysis in Epi Info of the Drug Availability Study data. The file is put in the C:\DMCI\SUM directory/folder. We strongly advise that you not use the original data files for customized analysis, but instead use the DASINFO.REC file. It contains all the information on the Drug Availability Study you entered through the DMCI program. The Export/Backup option on the Main Menu allows you to convert the data file into other file formats.

Create Drug Use Summary

This option calls an Epi Info program file that constructs a data file, DUSINFO.REC, for further customized analysis in Epi Info of the Drug Use data. The file is put in the directory/folder C:\DMCI\SUM. We strongly advise that you not use the original data files for customized analysis, but instead use the DUSINFO.REC file. It contains all the information on the Drug Use Study you entered through the DMCI program. The Export/Backup option on the Main Menu allows you to convert the data file into other file formats.

Export, Backup, and Restore Data

When you click on the option Export/Backup Survey Data, the following options are displayed:



Export Summary Data Files

This option lets you choose between the Availability (DASINFO.REC) and Drug Use (DUSINFO.REC) summary files, for which you then can specify whether you want them converted to a spreadsheet (Lotus123) or a database file (dBASE III format). The resulting files are stored in the C:\DMCI\SUM directory/folder.

Backup Data Files > Floppy

For this option you need a floppy diskette in you're a: drive. It creates three zipped files: one containing all the data, entry, check and program files of DMCI (DMCIDATA.ZIP), a second one containing a zipped copy of the summary data files (SUMMARY.ZIP), if they exist, and a third one containing the text files of the indicators (INDIC.ZIP), if they exist.

Backup after each session! It takes a few seconds or minutes and will save you hours of work if things go wrong.

Restore Data Files < Floppy

This option restores backed-up files from a floppy diskette in the A: drive. You need to insert your diskette with the backup files in the floppy drive A: before the program unzips the backed-up files.

Available HELP

The Epi Info Help function is available by pressing the F1 function key.

Some files will open displaying a HELP screen with important messages.

When entering data, the F9 function key will give access to pop-up pick lists, when they are available. Fields with pop-up pick lists have an asterisk (*) in front of them.

Shift-F1 will display additional help messages for particular fields where survey data needs to be entered.

Table 15. Data Entry Troubleshooting

Potential Problems	Possible Solutions
1. Data collection forms are incomplete	If one or more columns are blank for a given row on the data collection form, do not enter the data for that row (record). Entering “0” or “99” or “U” or “X” may skew the analysis, resulting in inaccurate results. Keep a count of how many rows (records) are not entered. Give this to the survey organizer, because it is important to make sure that there are a sufficient number of complete records for statistically valid analysis.
2. Occasionally a message may appear asking “Do you want to delete records not related?”	Always answer no. This is a bug in the Epi Info software.
3. Occasionally records are randomly marked for deletion. It is vital that all records are checked to ensure that none are inadvertently marked for deletion.	Unmark those records that were not meant to be marked for deletion before any records are permanently deleted. In order to check if a record has been marked for deletion, look at the bottom right corner of the screen. Record numbers with an asterisk (*) are marked for deletion. In order to unmark for deletion push F6; make sure the asterisk (*) disappears. This must be checked before exiting the data entry/edit session. Records marked for deletion are permanently removed every time you exit a session, or when you run the “Remove deleted records” option.

Potential Problems	Possible Solutions
4. Where to enter data from forms DUS-1, DUS-2, and DUS-4?	Data from these three forms are entered on the same data entry screen: Drug Use Study – Encounter Data. Both retrospective patient record data and observation data must be entered into the software to allow for correct analysis. To distinguish between the forms, enter P in the Data Source field for DUS-1 and O for DUS-2 and DUS-4. Ensure that all data is entered. Depending on whether O or P is entered, certain fields will be skipped (see manual p. 270 or Shift-F1 in the software for details).

ANNEX 7. DMCI EPI INFO DATA DICTIONARY

DMCI EPI INFO DATA DICTIONARY

This annex is included for those needing a more detailed and technical description of the Epi Info DMCI program. If you do not need to change the DMCI data entry and analysis program, you probably do not need to read this annex.

Data file: ADMIN.REC

This is a reference file used as pop-up pick list when entering data in TRACDRUG.REC and DRUGLIST.REC. Some records have been entered. The description can be edited but not the code.

Field	Type	Len	Deci	Description
ADMIN	Alpha	3	0	Contains a unique code for each route of administration, which cannot be edited.
ADESC	Alpha	30	0	Explains what the code in ADMIN means.

Data file: BASUNIT.REC

This is a reference file used as pop-up pick list when entering data in TRACDRUG.REC and DRUGLIST.REC. Contains the unique code for and description of the Basic Pharmaceutical Unit of a product. We have established a list that covers most of the commonly used ones. Several similar units have been regrouped under one code. This is also the unit that corresponds with the Mean International Unit Price. We would strongly suggest that you not edit or add to this file, until you have fully understood the implications of a change for calculating the cost of treatment (see section on Assigning Units to Drugs in Annex 6). If you have a unit that is not explicitly listed, try first to make them fit with an already existing code.

Field	Type	Len	Deci	Description
BASUNIT	Alpha	4	0	Unique code for the Basic Pharmaceutical Unit of a product.
BASDESC	Alpha	30	0	This field describes what the code in BASUNIT stands for.

Data file: CHILD.REC

This contains the data to identify uniquely each child included in the survey. Called by FACILITY.REC, calls DIAG.REC, THERAPY.REC and EXIT.REC

Field	Type	Len	Deci	Description
FACCODE	Alpha	2	0	The code of the facility, defined in the FACILITY.REC. Do not edit the code in this file: it links the CHILD.REC to the FACILITY.REC. Combines with PATNO to form CCODE, a unique identifier for each child in the survey.
FACNAME	Alpha	30	0	The name of the facility, defined in FACILITY.REC.
FACTYPE	Alpha	3	0	The type of the facility, defined in FACILITY.REC.

DATA	Alpha	1	0	The origin of the data. "O" for **O**bserved encounters and simulated purchases. "P" for retrospective data collected through **P**atient record review.
DATECONS	Date	8	0	Date on which the child was seen.
PATNO	Alpha	3	0	The number of the patient, as it figures on the data collection form. Combines with FACCODE to form CCODE, a unique identifier for each child included in the survey.
CCODE	Alpha	4	0	A calculated field through the combination of FACCODE with PATNO. Assigns a unique code to each encounter. If you try to enter a PATNO that combines into a CCODE that already exists, you will get an error message. You will have to enter a new PATNO.
CAGE	Integer	2	0	Age of the child in months. Less than one month is 0 months of age. Values greater than 59 are rejected, since the survey only concerns children under five years of age.
CGEND	Alpha	1	0	Gender of the child. Only "M" for male, "F" for female, and “U” for unknown are accepted.
SELFOR	Alpha	3	0	Indicates which complaint the child has been selected for. Only three values are accepted: ARI for all ARI, including pneumonia; DIA for all diarrhea, including dysentery; FEV for all fevers, including malaria and measles; NUT for all nutritional disorders, including anemia and malnutrition. Displays pop-up pick list when pressing F9.
RELQUES	Yes/No	1	0	Indicates whether the health care worker asked a question relative to the presented complaint.
QUESASS	Yes/No	1	0	Whether the health care worker asked any question to assess the severity of the disease.
INFOADM	Yes/No	1	0	Whether the health care worker gave any information on how to administer the recommended medicine.
ADVPROGR	Yes/No	1	0	Whether the health care worker gave any advice regarding the progression of the disease.
FEED	Yes/No	1	0	Whether the health care worker gave any counseling on feeding practices.
DIAG	Alpha	30	0	The code of the main diagnosis, picked from a pop-up from ILLNESS.REC. Main diagnosis is the one that is important for the survey: either the IMCI illness, or the “most serious” one. Displays pop-up pick list when pressing F9.
ICLASS	Alpha	3	0	Automatically entered when DIAG is entered. The IMCI classification corresponding with the diagnosis, as defined in ILLNESS.REC.
NUMBDIAG	Integer	1	0	Total number of diagnoses, if more than one is filled out on the data collection sheet. At least NUMBDIAG=1.
PRESCRIP	Yes/No	1	0	Indicates whether you want to enter the prescribing data for this encounter. "Y" will take you into the THERAPY.REC, "N" will skip you to the field DESCR. After entering prescribing data for a child, you will have to enter “N” to be able to proceed to DESCR.
DESCR	Yes/No	1	0	Indicates whether the child’s caregiver can describe accurately how to give all the recommended medicine.

Data file: CURR.REC

This contains the currencies used in the survey. In most cases, one local currency and the US dollar will be entered.

Field	Type	Len	Deci	Description
CURR	Alpha	3	0	Three digit code for the currency. Preferably this will be the internationally accepted abbreviation of the currency. Ex. USD
EXCH	Real	10	2	Value of the USD expressed in the listed currency. For the USD this is equal to 1.
CURRDESC	Alpha	30	0	Full description of the currency. Ex. United States Dollar.

Date file: DASINFO.REC

This is a summary data file, containing all data of the Drug Availability Study. Use this file for further customized analysis in Epi Info. The file is produced automatically from the available data in FACILITY.REC, TRACDRUG.REC and LOGISTIC.REC.

Field	Type	Len	Deci	Description
FACCODE	Alpha	2	0	Two digit unique code of the facility.
FACNAME	Alpha	30	0	Name of the facility.
FACTYPE	Alpha	5	0	Type of the facility.
MUNI	Alpha	30	0	Locality of the facility.
DIST	Alpha	30	0	District where the facility is located.
PROV	Alpha	30	0	Province where the facility is located.
VISIT	Date	8	0	Date of the visit of the survey team at the facility.
COMP	Yes/No	1	0	Was stock data taken from computer records.
STCARD	Yes/No	1	0	Was stock data taken from stock cards.
TALLY	Yes/No	1	0	Was stock data taken from a tally sheet.
MANLED	Yes/No	1	0	Was stock data taken from a ledger.
PRODUCT	Alpha	30	0	Unique code for each tracer drug.
PRODNAME	Alpha	29	0	Generic name of the tracer drug.
BASUNIT	Alpha	3	0	Basic Pharmaceutical Unit.
STRUNIT	Alpha	5	0	Strength unit of the tracer drug.
STRENGTH	Alpha	7	0	Number of strength units per basic unit.
ADMIN	Alpha	3	0	Route of administration of the drug.
RCOUNT	Integer	12	0	The number of Basic Units of this drug counted in the records.
ATOTAL	Real	12	0	The adjusted total of Basic Units counted in the records.
PCOUNT	Real	12	0	The total number Basic Units physically counted.
ESTOCK	Real	12	0	The number of expired Basic Units physically counted.
NONEXPIRED	Yes/No	1	0	Gives “Y” automatically if at least one unexpired Basic Unit has been counted (PCOUNT > 0). Used to calculate indicator 3.
DISCREP	Real	12	0	The difference in number of Basic Units between the adjusted total number of Basic Units in the records and the number of unexpired Basic Units physically counted: ATOTAL-PCOUNT.
CORRES	Yes/No	1	0	Gives “Y” automatically if (DISCREP=0). Used to calculate indicator 5.
TOTOUT	Integer	3	0	The total number of days out of stock during the last 12 months.
PERCOUT	Real	6	2	The percentage of time out of stock during the last 12 months for this product. Used to calculate indicator 4.

COMPUSD	Real	11	4	The price paid per basic unit of this product during the last MOH procurement in US dollars.
MEDINTER	Real	11	4	The median international procurement price in US dollars.
MOHPERC	Real	7	2	The MOH procurement price as percentage of the median international procurement price. Used to calculate indicator 2.

Data file: DISPENS.REC

This is a reference file used as pop-up pick list when entering data in TRACDRUG.REC and DRUGLIST.REC. Contains the description of the dispensing unit of the products. A list has been developed. We suggest that you not alter it.

Field	Type	Len	Deci	Description
DISUNIT	Alpha	3	0	Three digit code for the Dispensing Unit. Each Dispensing Unit contains one or more Basic Units.
DISDESC	Alpha	30	0	Describes what the DISUNIT stands for.

Data file: DRUGLIST.REC

This contains all the drugs found in the data collection forms of the prescribing study. The drugs can be entered by the name under which they are prescribed. One entry for each uniquely defined drug: different brand name, basic unit, or strength. All tracer drugs need to be entered in this list also. It is also a reference file used as pop-up pick list when entering data in THERAPY.REC.

Field	Type	Len	Deci	Description
PRODUCT	Alpha	30	0	Unique code for each tracer drug, obtained through the automatic combination of PRODNAME, BASUNIT, STRENGTH and STRUNIT. This field is not entered manually. If the combination is not unique, you will have to re-enter the information.
PRODNAME	Alpha	29	0	Name of the drug, as it figures in the data collection forms.
BASUNIT	Alpha	3	0	Basic Pharmaceutical Unit, picked from a pop-up of BASUNIT.REC. Displays pop-up pick list when pressing F9.
STRUNIT	Alpha	6	0	Strength unit of the tracer drug, picked from a pop-up of the STRENGTH.REC. Displays pop-up pick list when pressing F9.
STRENGTH	Alpha	7	0	Number of strength units per basic unit.
DISUNIT	Alpha	3	0	Dispensing unit of the drug, picked from a pop-up of DISPENS.REC. Displays pop-up pick list when pressing F9.
BASDIS	Real	12	5	Number of basic units per dispensing unit.
DUCTIS	Alpha	30	0	Nonsense field to confirm entry, repeats PRODNAME.
TEDAS	Alpha	3	0	Nonsense field to confirm entry, repeats BASUNIT.
OF	Alpha	6	0	Nonsense field to confirm entry, repeats STRENGTH + STRUNIT.
PER	Alpha	3	0	Nonsense field to confirm entry, repeats BASUNIT.
SEDAS	Alpha	3	0	Nonsense field to confirm entry, repeats DISUNIT.
NING	Real	12	5	Nonsense field to confirm entry, repeats BASDIS.
ENTPROD	Yes/No	1	0	“Y” enters the described product. “N” takes you back to PRODNAME.
ADMIN	Alpha	3	0	Route of administration of the drug, picked from a pop-up from ADMIN.REC. Displays pop-up pick list when pressing F9.
GENENAME	Alpha	30	0	Generic name of the product entered, picked from a pop-up of GENERIC.REC. Displays pop-up pick list when pressing F9.

PCT	Alpha	30	0	Displays the product on the second data entry page.
GENERIC	Yes/No	1	0	“Y” if the drug is generic, “N” if the drug is not generic.
INJEC	Yes/No	1	0	“Y” if the drug is injectable, “N” if the drug is not injectable.
ORS	Yes/No	1	0	“Y” if the drug is ORS, “N” if the drug is not ORS.
ANTIB	Yes/No	1	0	“Y” if the drug is an antibiotic, “N” if the drug is not an antibiotic.
ANTID	Yes/No	1	0	“Y” if the drug is an anti-diarrheal, “N” if the drug is not an anti-diarrheal.
ANTIM	Yes/No	1	0	“Y” if the drug is an anti-malarial, “N” if the drug is not an anti-malarial.
VITA	Yes/No	1	0	“Y” if the drug is a form of vitamin A, “N” if the drug is not a form of vitamin A.
IRON	Yes/No	1	0	“Y” if the drug is an iron supplement, “N” if the drug is not an iron supplement.
ONEDL	Yes/No	1	0	“Y” if the drug is on the essential drugs list, “N” if the drug is not in the essential drugs list.
IMCIL	Yes/No	1	0	“Y” if the drug is on the IMCI drug list, “N” if the drug is not on the IMCI drug list.
SALUSD	Real	11	4	Average sales price in US dollar of one Basic Unit in drug retail outlets, automatically calculated from PRODCOST.REC.

Data file: DUSINFO.REC

This is a summary data file, containing all data of the Drug Use Study. Use this file for further customized analysis in Epi Info. The file is produced automatically from the available data in FACILIY.REC, CHILD.REC, THERAPY.REC, DRUGLIST.REC, PRODCOST.REC, and IMCICOST.REC.

Field	**Type**	**Len**	**Deci**	**Description**
FACCODE	Alpha	2	0	Two digit unique code of the facility.
FACNAME	Alpha	30	0	Name of the facility.
FACTYPE	Alpha	5	0	Type of the facility.
MUNI	Alpha	30	0	Locality of the facility.
DIST	Alpha	30	0	District where the facility is located.
PROV	Alpha	30	0	Province where the facility is located.
VISIT	Date	8	0	Date of the visit of the survey team at the facility.
STM	Yes/No	1	0	Availability of standard treatment manual.
YEAR	Integer	4	0	Is STM available, the year of the publication.
IMCIGUID	Yes/No	1	0	Availability of IMCI guidelines.
REFR	Yes/No	1	0	Availability of “working refrigerator.”
TEMPMON	Yes/No	1	0	Availability of updated temperature monitor records.
DATA	Alpha	1	0	The origin of the data. "O" for Observed encounters and simulated purchases. "P" for retrospective data collected through Patient record review.
DATECONS	Date	8	0	Date on which the child was seen.
PATNO	Alpha	3	0	The number of the patient, as it figures on the data collection form.
CCODE	Alpha	4	0	Unique code for each encounter.
CAGE	Integer	2	0	Age of the child in months.
CGEND	Alpha	1	0	Gender of the child.
SELFOR	Alpha	3	0	Indicates which complaint the child has been selected for.
RELQUES	Yes/No	1	0	Indicates whether the health care worker asked a question relative to the presented complaint.

QUESASS	Yes/No	1	0	Whether the health care worker asked any question to assess the severity of the disease.
INFOADM	Yes/No	1	0	Whether the health care worker gave any information on how to administer the recommended medicine.
ADVPROGR	Yes/No	1	0	Whether the health care worker gave any advice regarding the progression of the disease.
FEED	Yes/No	1	0	Whether the health care worker gave any counseling on feeding practices.
DIAG	Alpha	30	0	The code of the main diagnosis, picked from a pop-up from ILLNESS.REC. Main diagnosis is the one that is important for the survey: either the IMCI illness, or the "most serious" one. Displays pop-up pick list when pressing F9.
ICLASS	Alpha	3	0	Automatically entered when DIAG is entered. The IMCI classification corresponding with the diagnosis, as defined in ILLNESS.REC.
NUMBDIAG	Integer	1	0	Total number of diagnoses.
DESCR	Yes/No	1	0	Indicates whether the child's caregiver can describe accurately how to give all the recommended medicine.
PRODUCT	Alpha	30	0	The code of the product, picked from a pop-up of DRUGLIST.
QDOSE	Real	8	3	Number of basic units prescribed in each dose administered.
TDOSE	Integer	2	0	Number of times a day QDOSE is to be administered.
NDAYS	Integer	2	0	Number of days the treatment has to be administered.
TOTBAS	Real	11	3	Total number of Basic Units prescribed.
DISPENSED	Yes/No	1	0	Whether this product was actually dispensed.
PRODNAME	Alpha	29	0	Name of the drug, as it figures in the data collection forms.
BASUNIT	Alpha	3	0	Basic Pharmaceutical Unit.
STRUNIT	Alpha	6	0	Strength unit of the tracer drug.
STRENGTH	Alpha	7	0	Number of strength units per basic unit.
DISUNIT	Alpha	3	0	Dispensing unit of the drug.
BASDIS	Real	12	5	Number of basic units per dispensing unit.
ADMIN	Alpha	3	0	Route of administration of the drug.
GENEQUI	Alpha	30	0	Generic equivalent of the product entered.
GENERIC	Yes/No	1	0	"Y" if the drug is generic.
INJEC	Yes/No	1	0	"Y" if the drug is injectable.
ORS	Yes/No	1	0	"Y" if the drug is ORS.
ANTIB	Yes/No	1	0	"Y" if the drug is an antibiotic.
ANTID	Yes/No	1	0	"Y" if the drug is an anti-diarrheal.
ANTIM	Yes/No	1	0	"Y" if the drug is an anti-malarial.
VITA	Yes/No	1	0	"Y" if the drug is a form of vitamin A.
IRON	Yes/No	1	0	"Y" if the drug is an iron supplement.
ONEDL	Yes/No	1	0	"Y" if the drug is on the essential drugs list.
IMCIL	Yes/No	1	0	"Y" if the drug is on the IMCI drug list.
SALUSD	Real	11	4	Average sales price in US dollars of one Basic Unit.

Data file: FACILITY.REC

This contains all the information pertaining to one facility. It calls LOGISTIC.REC and CHILD.REC.

Field	**Type**	**Len**	**Deci**	**Description**
FACCODE	Alpha	2	0	Two digit unique code of the facility.
FACNAME	Alpha	30	0	Name of the facility.

FACTYPE	Alpha	5	0	Type of the facility. Picked from pop-up of FACTYP.REC. Displays pop-up pick list when pressing F9.
MUNI	Alpha	30	0	Locality of the facility, entered manually.
DIST	Alpha	30	0	District where the facility is located. Picked from pop-up of GEO.REC. Displays pop-up pick list when pressing F9.
PROV	Alpha	30	0	Province where the facility is located. Automatically entered when district is picked from GEO.REC.
VISIT	Date	8	0	Date of the visit of the survey team at the facility. The year can't be later than 2100.
STM	Yes/No	1	0	Availability of standard treatment manual.
YEAR	Integer	4	0	If STM available, the year of the publication.
IMCIGUID	Yes/No	1	0	Availability of IMCI guidelines.
REFR	Yes/No	1	0	Availability of "working refrigerator."
TEMPMON	Yes/No	1	0	Availability of updated temperature monitor records.
FC	Alpha	2	0	Displays facility code on second page.
FN	Alpha	30	0	Displays facility name on second page.
FT	Alpha	4	0	Displays facility type on second page.
COMP	Yes/No	1	0	Was stock data taken from computer records.
STCARD	Yes/No	1	0	Was stock data taken from stock cards.
TALLY	Yes/No	1	0	Was stock data taken from a tally sheet.
MANLED	Yes/No	1	0	Was stock data taken from a ledger.
DASDATA	Yes/No	1	0	Whether you want to enter Drug Availability Study data. "Y" takes you to LOGISTIC.REC. "N" takes you to DUSDATA.
DUSDATA	Yes/No	1	0	Whether you want to enter Drug Utilization Study data. "Y" takes you to CHILD.REC, "N" takes you to the next record.

Data file: FACTYP.REC

This is a reference file used as pop-up pick list when entering data in FACILITY.REC. It contains all the types of facilities included in the study.

Field	Type	Len	Deci	Description
FACTYPE	Alpha	4	0	Unique code for each type of facility. In order to facilitate automated analysis, nine codes have been entered and cannot be changed. Six of the codes refer to different levels of MOH clinical facilities, two to different levels of MOH storage facilities, one to the private pharmaceutical outlets of the simulated purchase surveys: HOS1 HOS2 HOS3 CLI1 CLI2 BAS CMS RMS PRIV The entry and edit program does not allow you to change the codes. Altering them will prevent the analysis program from running automatically.
FDESC	Alpha	30	0	You can assign any description to the previous codes, as long as you keep this description consistent throughout the survey.

Data file: GENCOST.REC

This is a look-up file, calculated from DRUGLIST.REC. It contains the mean unit price of the generic products encountered in the survey and included in the IMCI product list.

Field	Type	Len	Deci	Description
GENCODE	Alpha	30	0	The code for the generic name of the drug recorded in the survey, containing an abbreviation of the generic name and the strength per basic unit.
GENUSD	Real	11	4	The mean price of one basic unit of the generic product.

Data file: GENERIC.REC

This is a reference file used as pop-up pick list when entering data in DRUGLIST.REC. It contains the generic equivalent name of the each drug recorded in the survey.

Field	Type	Len	Deci	Description
GENNAME	Alpha	30	0	The generic name of the drug recorded in the survey.

Data file: GEO.REC

This is a reference file used as pop-up pick list when entering data in FACILITY.REC. It contains the name of districts and provinces where the survey takes place.

Field	Type	Len	Deci	Description
DIST	Alpha	30	0	Name of the district.
PROV	Alpha	30	0	Name of the province the district is located in. Be careful to spell each province exactly the same each time it is entered.

Data file: ILLNESS.REC

This is a reference file used as pop-up pick list when entering data in CHILD.REC. It contains all the illnesses to be included in the survey. It also classifies them according to the IMCI classification.

Field	Type	Len	Deci	Description
IDESC	Alpha	30	0	The name of the illness.
ICLASS	Alpha	3	0	Its IMCI classification. In order to facilitate analysis, only the following entries are allowed: ANE = anemia ARI = no-pneumonia ARI that does not need antibiotics DIA = diarrhea that does not need antibiotics MAL = fevers classified as malaria MSL = measles PNE = ARI classified as pneumonia WGH = under weight for age OTH = all others

Data file: IMCICALC.REC

This contains the cost for each combination of drugs, accepted as recommended standard treatment for the four illnesses for which cost comparison is performed.

Field	Type	Len	Deci	Description
ICLASS	Alpha	3	0	IMCI classification code, though a pop-up pick list (F9).
IDESC	Alpha	30	0	Description of the IMCI illness, automatically entered when ICLASS is entered.
HOWMANY	Integer	1	0	The number of drugs accepted in one standard treatment for a particular IMCI illness. This is at least 1 and not more than 3.
NAMEDR1	Alpha	30	0	Code of the generic product, taken from GENCOST.REC through a pop-up pick list (F9).
COSTBAS1	Real	11	4	Price of one unit of the generic product, as defined in GENCOST.REC. Automatically entered when NAMEDR1 is entered.
TOTBAS1	Real	9	2	The total number of basic units of the generic product required for a complete course of the recommended standard treatment.
TRCOST1	Real	11	4	The cost of the generic product in this treatment. Automatically entered: COSTBAS1 x TOTBAS1.
NAMEDR2	Alpha	30	0	Code of the generic product, taken from GENCOST.REC through a pop-up pick list (F9). Field is not accessible if HOWMANY is less than 2.
COSTBAS2	Real	11	4	Price of one unit of the generic product, as defined in GENCOST.REC. Automatically entered when NAMEDR2 is entered.
TOTBAS2	Real	9	2	The total number of basic units of the generic product required for a complete course of the recommended standard treatment.
TRCOST2	Real	11	4	The cost of the generic product in this treatment. Automatically entered: COSTBAS2 x TOTBAS2.
NAMEDR3	Alpha	30	0	Code of the generic product, taken from GENCOST.REC through a pop-up pick list (F9). Field is not accessible if HOWMANY is less than 3.
COSTBAS3	Real	11	4	Price of one unit of the generic product, as defined in GENCOST.REC. Automatically entered when NAMEDR3 is entered.
TOTBAS3	Real	9	2	The total number of basic units of the generic product required for a complete course of the recommended standard treatment.
TRCOST3	Real	11	4	The cost of the generic product in this treatment. Automatically entered: COSTBAS3 x TOTBAS3.
TOTCOST	Real	11	4	Automatically calculated: TRCOST1 + TRCOST2 + TRCOST3.
PERCAS	Integer	3	0	The percentage of all cases of this IMCI illness that would be prescribed the recommended standard treatment as described above. If less than 100, DMCI will prompt the user to enter another standard treatment.

Data file: IMCICOST.REC

This contains the cost for the four illnesses for which cost comparison is performed. The file is calculated by DMCI from the IMCICALC.REC file.

Field	Type	Len	Deci	Description
ICLASS	Alpha	3	0	IMCI classification code.
IDESC	Alpha	30	0	Description of the IMCI illness.
COSTUSD	Real	11	4	Automatically calculated by DMCI.

Data file: LOGISTIC.REC

This contains the data of the drug availability study. It is called by FACILITY.REC.

Field	Type	Len	Deci	Description
FACCODE	Alpha	2	0	The code of the facility, defined in the FACILITY.REC. Do not edit the code in this file. Combines with PRODUCT to form PRODEX, a unique identifier for each tracer drug in each facility in the survey.
FACNAME	Alpha	30	0	The name of the facility, defined in FACILITY.REC.
FACTYPE	Alpha	3	0	The type of the facility, defined in FACILITY.REC.
PRODUCT	Alpha	30	0	Code of the product, picked from a pop-up of TRACDRUG.REC. Combines with FACCODE to form PRODEX, a unique identifier for each tracer drug in each facility in the survey. Displays pop-up pick list when pressing F9.
PRODEX	Alpha	30	0	Unique code for each product prescribed to each child. Obtained through automatic combination of CCODE + PRODUCT. An error message indicates when you try to enter the same tracer drug twice for one facility. You will then have to go back to PRODUCT. Not used in analysis.
RCOUNT	Integer	12	0	The number of Basic Units counted in the records.
ATOTAL	Integer	12	0	The adjusted total of Basic Units counted in the records.
PCOUNT	Integer	12	0	The number of unexpired Basic Units physically counted.
ESTOCK	Integer	12	0	The number of expired Basic Units physically counted.
NONEXPIRED	Yes/No	1	0	Gives “Y” automatically if at least one unexpired Basic Unit has been counted (PCOUNT > 0). Used to calculate indicator 3.
DISCREP	Integer	12	0	Gives automatically the difference between the adjusted total number of Basic Units in the records and the number of unexpired Basic Units physically counted: ATOTAL-PCOUNT.
CORRES	Yes/No	1	0	Gives “Y” automatically if (DISCREP=0). Used to calculate indicator 5.
TOTOUT	Integer	3	0	The total number of days out of stock during the last 12 months.
PERCOUT	Real	6	2	The percentage of time out of stock during the last 12 months for this product. Used to calculate indicator 4.

Data file: PRODCOST.REC

This contains the prices of the drugs recorded in DRUGLIST.REC.

Field	Type	Len	Deci	Description
PRODUCT	Alpha	30	0	Code of the drug, entered through pop-up of DRUGLIST.REC.
BASUNIT	Alpha	3	0	Code of the Basic Unit, entered through pop-up of BASUNIT.REC.
PACKINGUNIT	Alpha	20	0	Smallest unit in which the product is packed and sold. Entered manually.
BASICUNITS	Real	7	2	Number of Basic Units per Packing Unit.
PRICEPACKI	Real	11	4	Sales price of one Packing Unit of the product.
PRICEBASIC	Real	11	4	Sales price of one Basic Unit, automatically calculated: PRICEPACKI / BASICUNITS.
CURR	Alpha	3	0	Pop-up from CURR.REC.
EXCH	Real	10	2	Exchange rate to the USD, automatically entered when CURR is entered.

SALUSD	Real	11	4	Sales price per Basic Unit in US dollars, automatically calculated PRICEBASIC / EXCH.
CHECKPRICE	Yes/No	1	0	If the above entries are correct, "Y" takes you to the next record. If not, "N" takes you to PRODUCT.

Data file: STRENGTH.REC

This is a reference file used as pop-up pick list when entering data in DRUGLIST.REC and TRACDRUG.REC. Contains the valid codes for the strength unit. We suggest that you keep those already entered.

Field	Type	Len	Deci	Description
STRUNIT	Alpha	5	0	Unique code for each strength unit. A list has been entered. Before you enter additional strength units, you must understand exactly how they relate to BASUNIT and DISUNIT to calculate unit prices.
SDESC	Alpha	35	0	Description of the strength unit.

Data file: THERAPY.REC

This contains all the products prescribed for each child. More than one product can be entered for each child. Called by CHILD.REC.

Field	Type	Len	Deci	Description
FACCODE	Alpha	2	0	The code of the facility, defined in the FACILITY.REC. Do not edit the code in this file.
FACNAME	Alpha	30	0	The name of the facility, defined in FACILITY.REC.
FACTYPE	Alpha	3	0	The type of the facility, defined in FACILITY.REC.
CCODE	Alpha	5	0	The code of the child, defined in CHILD.REC. Combines with PRODUCT to form PRODEX, a unique identifier for each drug prescribed to each child in each facility in the survey.
PRODUCT	Alpha	30	0	The code of the product, picked from a pop-up of DRUGLIST. Combines with CCODE to form PRODEX, a unique identifier for each drug prescribed to each child in each facility in the survey.
PRODEX	Alpha	30	0	Unique code for each product prescribed to each child. Obtained through automatic combination of CCODE + PRODUCT. An error message indicates when you try to enter the same product twice for a child.
QDOSE	Real	8	3	Number of basic units prescribed in each dose administered.
TDOSE	Integer	2	0	Number of times a day QDOSE is to be administered.
NDAYS	Integer	2	0	Number of days the treatment has to be administered.
TOTBAS	Real	11	3	Total number of Basic Units prescribed, automatically calculated from QDOSE x TDOSE x NDAYS.
ENTDATA	Yes/No	1	0	If the above entries are correct, "Y" takes you to DISPENSED. If not, "N" takes you to FACCODE.
DISPENSED	Yes/No	1	0	Whether this product was actually dispensed.
DISCORRECT	Yes/No	1	0	Whether this product (antibiotic) was dispensed correctly.

Data file: TRACDRUG.REC

This contains the list of all the tracer drugs whose availability is assessed in governmental warehouses and health facilities. Serves as look-up list for the LOGISTIC.REC.

Field	Type	Len	Deci	Description
PRODUCT	Alpha	30	0	Unique code for each tracer drug, obtained through the automatic combination of PRODNAME, BASUNIT, STRENGTH and STRUNIT. This field is not entered manually. If the combination is not unique, you will have to re-enter the information.
PRODNAME	Alpha	29	0	Generic name of the tracer drug.
BASUNIT	Alpha	3	0	Basic Pharmaceutical Unit, picked from a pop-up of BASUNIT.REC. Displays pop-up pick list when pressing F9.
STRUNIT	Alpha	5	0	Strength unit of the tracer drug, picked from a pop-up of the STRENGTH.REC. Displays pop-up pick list when pressing F9.
STRENGTH	Alpha	7	0	Number of strength units per basic unit.
DUCTIS	Alpha	30	0	Nonsense field for confirmation of entry: PRODNAME.
TEDAS	Alpha	4	0	Nonsense field for confirmation of entry: BASUNIT.
OF	Alpha	6	0	Nonsense field for confirmation of entry: STRENGTH+STRUNIT.
PER	Alpha	4	0	Nonsense field for confirmation of entry: BASUNIT.
ENTTRAC	Yes/No	1	0	Confirmation of entry. “Y” accepts the entered information and permits you to proceed to the next entry. “N” brings the cursor back to PRODNAME.
ADMIN	Alpha	3	0	Route of administration of the drug, picked from a pop-up from ADMIN.REC. Displays pop-up pick list when pressing F9.
PDT	Alpha	30	0	Nonsense field to display the product on the second page.
COMPPRICE	Real	11	4	Comparison price: average MOH procurement price in the last procurement.
CURR	Alpha	3	0	Currency of the procurement price.
EXCH	Real	7	2	Exchange rate, automatically entered when CURR is entered.
COMPUSD	Real	11	4	Comparison price in US dollars, automatically entered when EXCH is entered.
MEDINTER	Real	11	4	Median international procurement price, taken from the *International Drug Price Indicator Guide.*
MOHPERC	Real	7	2	Automatically calculated: COMPPRICE as percentage of MEDINTER.

REFERENCES

Gonzalez Ochoa, E., L. Armas Perez, J.R. Bravo Gonzalez, J. Cabrales Escobar, R. Rosales Corrales, and G. Abreu Suarez. 1996. Prescription of antibiotics for mild acute respiratory infections in children. *Bull. Pan Am. Health Org*. 30:106–17.

Hugh, M., and G. Corrales. January 1995. Proyecto de servicios de salud descentralizados (SSD) MINSA - USAID. Capacitacion gerencial sobre el manejo de infection respiratoria aguda (CGIRA) - Informe preliminar - Analisis de la CGIRA. [Analysis of the impact of management training on the treatment of ARI - Preliminary report - Analysis of ARI]. Management Sciences for Health.

International Network for the Rational Usage of Drugs (INRUD) Social Scientists Working Group. How to Use Qualitative Methods to Design Drug Use Interventions. Working Draft, December 1996. Arlington, Va.: Management Sciences for Health.

Management Sciences for Health. 1997. *Managing Drug Supply: The Selection, Procurement, Distribution, and Use of Pharmaceuticals in Primary Health Care.* Ed. 2, Revised and Expanded. West Hartford, Ct.: Kumarian Press.

Murray, John, and Serge Manoncourt. 1998. *Integrated Health Facility Assessment Manual: Using Local Planning to Improve the Quality of Child Care at Health Facilities.* Arlington, Va.: Published for the U.S. Agency for International Development by the Basic Support for Institutionalizing Child Survival (BASICS) Project.

Reynolds, James E. F., ed. 1993. *MARTINDALE: The Extra Pharmacopeia*. Ed. 13. London: The Pharmaceutical Press.

Support for Analysis and Research in Africa (SARA), Health and Human Resources Analysis for Africa (HHRAA), United States Agency for International Development (USAID), Africa Bureau, Office of Sustainable Development in collaboration with Basic Support for Institutionalizing Child Survival (BASICS). 1997. *Guide for the Introduction of Integrated Management of Childhood Illness.* Washington, D.C.: SARA project.

World Health Organization (WHO). September 1996. *Integrated Management of Childhood Illness Process Course.* (ODUS/HCP/HCT/ARI/CDD/96.4L); Assess and Classify the Sick Child. Geneva: WHO.

World Health Organization (WHO)/Division of Child Health and Development (CHD). June 1997. IMCI Adaptation Guide. Parts 1–4. Working draft version 3: For limited distribution only. Geneva: WHO/CHD.